The Newspaper of Information Systems Management
June 10, 1996, Vol. 30, No. 24, 142 Pages, $6/Copy, $48/Year

COMPUTERWORLD

Visual Basic, Java vie for 'net crown

By Sharon Gaudin and Frank Hayes

Microsoft Corp. is winding up for an early knockout in the Internet ring. Its game plan is to get developers to substitute Visual Basic for Sun Microsystems, Inc.'s Java language.

The key is that Visual Basic has a much bigger user base than Java, according to Judith Hurwitz, president of Hurwitz Group, Inc. in Newton, Mass. "If Microsoft can take Visual Basic and make it viable for the Internet ... then the potential [is there] that people will say, 'Gee, we already know this. We don't have to retrain and spend a lot of money,'" she said. "[Microsoft] could win."

But Java's biggest supporters — Sun, IBM and Netscape Communications Corp. — won't go down without a fight.

"It's a 'Visual Basic everywhere' strategy,"

Visual Basic, Java, *page 109*

Winston's Playhouse *was created with Microsoft's new HTML Layout Control, designed for two-dimensional object layering. When you click on the house, the door swings open. HTML Layout Control is one of several products Microsoft will release this week that focus on creating ActiveX-enabled Web sites.*

DEC boosts reliance on channel partners

By Jaikumar Vijayan

Internal roiling at Digital Equipment Corp. over how best to deal with customers is about to spark another overhaul of its sales force. However, the company is sending mixed signals about whether the news will be good or bad for large customers.

One thing is clear: Digital's channel partners will start to play a bigger role. How this will affect direct accounts is unclear, but analysts and some users predict that some large customers will lose direct account status while smaller companies will gain a more direct flow of information from assigned Digital represen-

DEC, *page 16*

What Digital's business reorganization means for some of its biggest customers:

- Increased channel role in new system purchases, order processing, system configuration and installation

What the reorganization means for Digital:

- Lower cost of sales and distribution

Notebook advances spark heated debate

By Mindy Blodgett and Melissa Bane

For one corporate road warrior, faster isn't necessarily better when it comes to notebooks.

"The president of my company complains that his [133-MHz] Compaq notebook gets only 45 minutes of battery life," said Douglas Moran, information systems analyst at CRSS Constructors, Inc. in Denver. "He has started telling me he misses his 486. With the 486, he used to make it almost all the way across the country on just one battery."

Moran's boss isn't alone. "Faster, lighter, smaller" has been the mantra in the notebook industry and is the driving force behind new releases. But users must trade the advantages of lighter-than-air desktop replacement notebooks for shorter battery life and overheated components, including PC cards.

Mobile computing

"Heat dissipation is always a challenge in a laptop," said Dan Coolidge, an attorney at Sheehan, Phinney, Bass & Green in Manchester, N.H. "But for users like me, the issue is reliability and battery life. It's up to the notebook makers to

Notebook advances, *page 109*

WHAT'S INSIDE

- Hewlett-Packard in the next few months will announce a series of security products aimed at making the online world safer for business. See story, page 6, *by Craig Stedman.*
- The *Computerworld* Smithsonian Awards, presented last week, honor technological innovation. Check out the 1996 winners on pages 36 and 37.
- What's happening at the high end? Find out in *Computerworld*'s exclusive survey report on the future of massively parallel processing and symmetrical multiprocessing. See insert, following page 32.

Users snubbing router firewalls

By Bob Wallace

Internetworking vendors are starting to tackle security issues in earnest by offering router firewall options designed to keep hackers from breaking in to enterprise networks. But users aren't exactly applauding.

Last week's much-ballyhooed introductions by Ascend Communications, Inc. and Bay Networks, Inc. raise more issues than they address, according to analysts. The products are just the beginning of a trend, they said.

Firewalls are software gateways, usually running on dedicated computers or routers, that sit between the Internet and the corporate network. They can be programmed to block intrusions by hackers through remote sites.

Firewalls, *page 16*

Newspaper

A PUBLICATION OF IDG

Inside Computerworld

June 10, 1996

News

NEWS

Buck busters
Users building enterprise networks get price breaks from some vendors.

Selling big on the Web
An electronics distributor sells $40,000 worth of merchandise each month from its home page.

Getting their acts together
IBM and Digital are joining their messaging middleware and object request brokers.

'net security framework
Microsoft announces a security road map for the Internet.

R/3 goes retail
SAP is preparing a version of its R/3 software for retailers.

PC Expo preview
Mobile computing and the Internet will be highlights at next week's PC Expo trade show.

AS/400 and the Web
IBM's updated AS/400 operating system has a leg up on the Internet.

OPINION

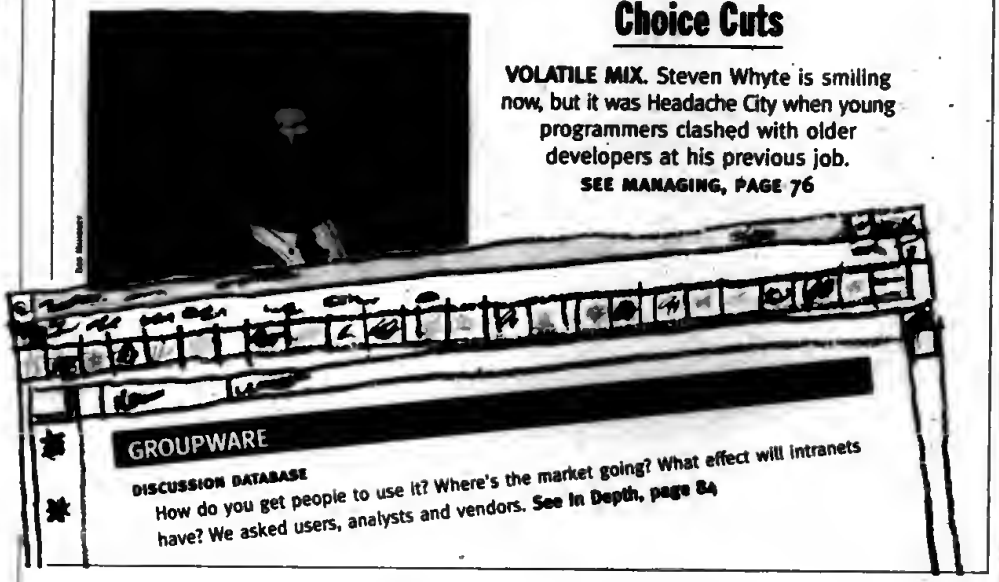
The ATM frenzy
Once again, hot technology forecasts lose out to common sense, Paul Gillin says.

IBM and the Internet
Surprise! IBM is making a credible run at becoming a seriously wired vendor for electronic commerce, IBM-watcher Sam Albert says.

This week in Computerworld

- **Tools you can use**
  Our new Toolbox section provides IS professionals with the right tool for the job
- **Your cheatin' heart**
  You're with your vendor today, but will you be loyal to it a year from now? See MindShare, which tracks IT buying intentions.
- **Up close and personal**
  Get a word in with Computerworld personalities in our new Forums section

www.computerworld.com



Choice Cuts

VOLATILE MIX. Steven Whyte is smiling now, but it was Headache City when young programmers clashed with older developers at his previous job.
SEE MANAGING, PAGE 76

GROUPWARE

DISCUSSION DATABASE
How do you get people to use it? Where's the market going? What effect will intranets have? We asked users, analysts and vendors. See In Depth, page 84

Technical Sections

SERVERS & PCS

IBM's 64-bit woes
Of the major Unix vendors, IBM is last out of the gate with a 64-bit chip. That leaves its RS/6000 line vulnerable.

Multimedia notebooks
New multimedia notebooks from Sharp and Dell show off brighter displays and other features.

SOFTWARE

Java apps
Users are still sorting out the benefits of Java-based applications.

HP middlewnre
Hewlett-Packard's little-used middleware product can now fetch files from multiple databases for Java-enabled clients.

THE ENTERPRISE NETWORK

Token Ring
Longtime Token Ring users are moving to Ethernet switching to save money and boost network performance.

MOM knows best
Message-oriented middleware (MOM) is catching on in corporate America.

THE INTERNET

Security
Experts outline top security threats and protections.

'net-enabled Delphi
Borland adds Internet support to Delphi.

CORPORATE STRATEGIES

Mapping it out
Customers are using geographic information systems to improve customer service.

Busting the paper demon
Hoechst Marion Roussel needed document management software to help it speed new drug applications to the FDA.

Features

MANAGING

Mixing veterans and newcomers on the same development team

CIO turnover
Paul Strassmann comments on the short corporate lives of chief information officers.

IN DEPTH

A discussion database on the future of groupware

CAREERS

Jumpin' Java
The cup runneth over for IS pros with Java skills. Learn how four Java junkies got their start.

MARKETPLACE

Infrared review
Infrared technology is gaining an increased role in connectivity as the barriers to speed drop.

FINANCE & INVESTING

Clean sailing
Safe harbor law lets companies release more substantial information.

Etc.

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Where Else In The World Can You Do All This???

The Second Annual CA World 96

CA-World '96 is 5 technology-filled, information-packed days. Listen, learn, participate and share all the latest in technological breakthroughs and industry trends.

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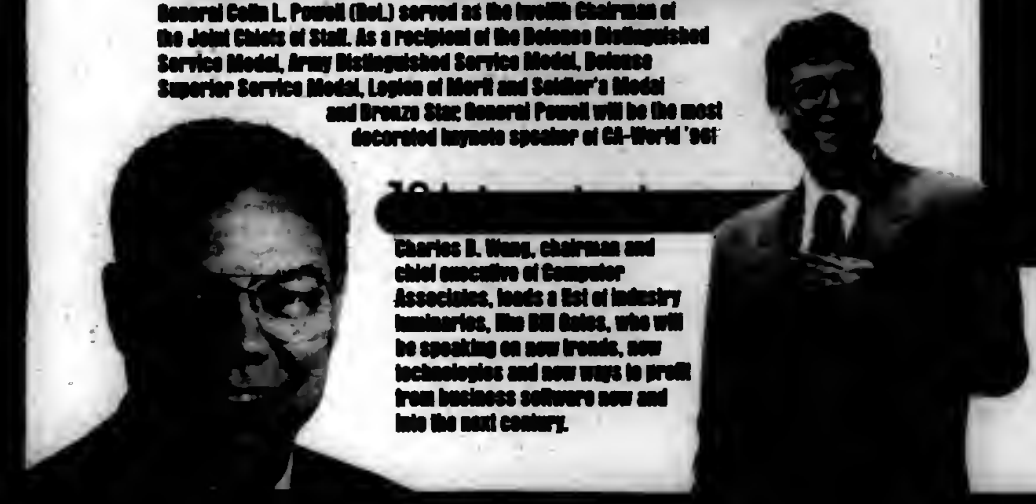
BAC	InfoExchange
CADRE	IngresWorld
CAMUS	opsXchange
ESAC	Partnership
GEM	PRMS
IDIG	TechniCon

General Colin L. Powell (Ret.) served as the twelfth Chairman of the Joint Chiefs of Staff. As a recipient of the Defense Distinguished Service Medal, Army Distinguished Service Medal, Defense Superior Service Medal, Legion of Merit and Soldier's Medal and Bronze Star, General Powell will be the most decorated keynote speaker at CA-World '96!



Charles B. Wang, chairman and chief executive of Computer Associates, leads a list of industry luminaries, like Bill Gates, who will be speaking on new trends, new technologies and new ways to profit from business software now and into the next century.

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computerworld index

Compiled by Laura Hunt and Mitch Betts

Value of 100 shares of AT&T in 1984 (before divestiture): $4,150
Value of 100 shares of AT&T and the Baby Bells in March 1996: $43,820

Office workers worldwide who have PCs: less than 15%

Homes worldwide that have PCs: less than 5%

World population that has any kind of Internet access (E-mail included): less than 1%

Population worldwide that has never heard a telephone dial tone: over 50%

Price of prominent placement on Netscape's Web search page: $5 million

Typical response rate for software registration via postcards: 20%

Typical response rate for online software registration: 40%-80%

Estimated value of Lycos initial public stock offering: $48 million
Lycos' revenue, first six months of fiscal year 1996: $1 million
Lycos' reported loss, first six months of fiscal year 1996: -$1.3 million

Press mentions of Intranet in 1994: 28
Press mentions of Intranet in 1995: 554
Press mentions of Intranet to date in 1996: 5,737

Edify's revenue in 1995: $16 million
Edify's net worth on May 4, 1996: $840 million

Time required to set up a Macintosh at a recent Software Publishers Association meeting: 16 min., 15 sec.

Time required to set up an Intel/Windows PC: 26 min., 15 sec.

Age of Max Stala, the Macintosh expert who did the setup: 10 years

Projected contribution of the "information marketplace" to the U.S. gross domestic product in 2010: 20%

Today's contribution of the "information marketplace" to the U.S. gross domestic product: 10%

Sources: Business Week; Morgan Stanley & Co.'s The Internet Report (Harperbusiness, 1996); Pipeline Communications, Inc., "Pipeline Washington Letter;" CIO magazine; International Telecommunications Union; Wall Journal, "Electronic Information Report;" Wired; Associated Press

■ Send contributions of offbeat news, lists and anecdotes to mbetts@cw.com.

Tired of scooping kitty litter? This computerized LitterMaid from Comtrad Industries in Midlothian, Va., has an electric eye that senses when your cat exits the box. Then the microprocessor starts an automatic sifter that deposits waste in a sealed container. The LitterMaid costs $199.

Symbol Technologies in Bohemia, N.Y., released a wearable bar-code scanner in 1992 that gave new meaning to the concept of point and shoot. This is the next generation, which is less bulky and frees users' hands. The RS-1 Ring Scanner fits on a user's forefinger and is activated by a button on the side. At 1.7 ounces, it may be the world's smallest laser scanner. It connects to a variety of portable computing devices, such as Symbol's WS-1000 wrist computer.

Hewlett-Packard has taken publicity stunts to new lengths. HP recently got 700 Los Angeles-area schoolchildren, parents and teachers to assemble more than 2,000 puzzle pieces to create what may be the world's largest computer-generated puzzle. The 27,000-sq.-ft. puzzle was assembled in about two hours. The interlocking pieces were printed by HP color printers. The stunt required 42,000 feet of recycled paper.

Switch makers try price cuts

By Bob Wallace

Switch vendors Network Equipment Technologies, Inc. (NET) and Madge Networks, Inc. are looking to break price barriers that will enable users to save big bucks when they build enterprise networks.

NET, based in Redwood City, Calif., last week announced new capabilities for its Integrated Digital Network Exchange (IDNX) switch that lower the cost of building frame-relay networks from $1,600 per port to roughly $500 per port. Madge, in San Jose, Calif., unveiled its Visage Ethernet LAN switch, which costs less than $190 per port.

NET officials said they hope the move will help close the market share gap between it and StrataCom, Inc. In the meantime, Madge's first low-end Ethernet switch will battle 3Com Corp., Cabletron Systems, Inc. and Cisco Systems, Inc.

Exciting news

One longtime NET user said she was excited about the IDNX components, which are shipping now. "They'll help us expand our private frame-relay network much more easily and far less expensively than we could have before," said Deborah Philipeck, vice president of client/server computing and telecommunications at the Federated Systems Group, the networking unit of Cincinnati-based Federated Department Stores, Inc. The company already runs a 450-site frame-relay network with NET IDNX switches.

StrataCom's IPX switches are more expensive, up to $700 per port, but StrataCom officials said they are working to lower that price.

The private frame-relay switch market shows steady and healthy growth, doubling in size from roughly $155.6 million last year to an estimated $332.1 million in 1998, according to Vertical Systems Group, Inc., a consulting and research firm in Dedham, Mass.

But Madge faces an uphill battle because it isn't a market power in low-end Ethernet switching.

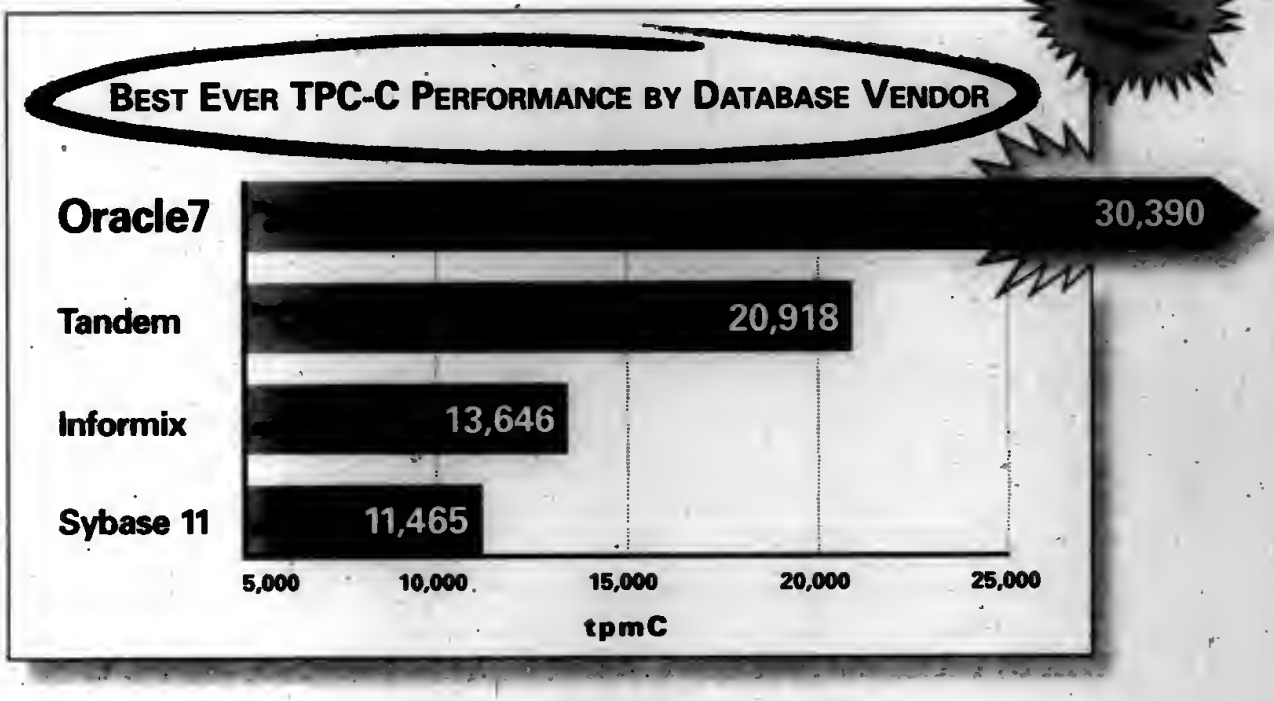
"It's great that Madge has extended its Ethernet switch line down into the desktop switching market, but they've got to take on the likes of 3Com, which is no easy task," said Tam Dell'Oro, president of the Dell'Oro Group, a market research firm in Menlo Park, Calif.

The $190-per-port price includes 24 switched Ethernet ports, two Fast Ethernet uplinks and network management.

Token Ring users go with Ethernet switching. See page 55.

Oracle7 Parallel Server: Safe at any Speed

Oracle7 Parallel Server™ breaks Tandem's TPC-C world record! The TPC-C benchmark is the industry standard test for measuring database On-Line Transaction Processing (OLTP) performance.



"Oracle has a superb solution for enterprise-class OLTP. They have literally achieved results we only dreamed of a few years ago."—**Peter Kastner, Vice President, Aberdeen Group**

Oracle Parallel Server enables multiple computers to simultaneously access the same database. Multiple computers working together means you get record breaking performance, and there is no single point of failure in the system. If one of those computers should fail—your application continues to run on the other machine(s). If you love speed but don't want to crash, call us at 1-800-633-1071, ext. 8130 or find us on the Web at http://www.oracle.com. If crashing at low speed seems OK, call Informix or Sybase. They just haven't been able to make multiple computers work together yet.

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©1996 Oracle Corporation. Oracle is a registered trademark, and Oracle7 Parallel Server and Enabling the Information Age are trademarks of Oracle Corporation. All rights reserved. TPC-C results as of April 17, 1996. TPC is a registered trademark of the Transaction Processing Performance Council. Oracle on Digital AlphaServer 8400 TruCluster configuration, four systems with 8 CPUs 30,390 tpmC at $305/tpmC. Informix on Digital AlphaServer 8400 system with 10 CPUs 13,646 tpmC at $277/tpmC. Sybase on Sun Ultra Enterprise 5000 system with 12 CPUs 11,485 tpmC at $191/tpmC. *Results for Tandem on Tandem Himalaya K10000-112 system with 112 CPUs 20,918 tpmC at $1,351/tpmC were withdrawn April 12, 1996 and no longer represent official TPC results. All other company and product names are trademarks of their respective owners.

Distributor uses news to sell Web ads

By Robert L. Scheier

Online "zines" fade almost as fast as they appear on the World Wide Web, but look who's selling advertising on their own Web site: a 1.2 billion electronics distributor.

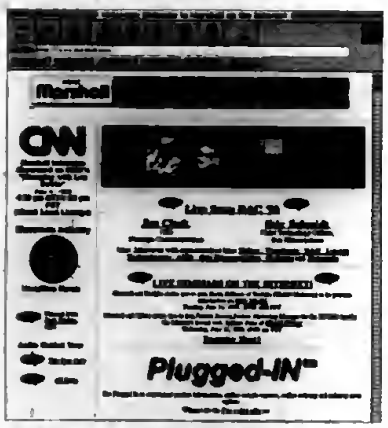
Marshall Industries in El Monte, Calif., is able to sell those ads because it spices up the parts lists and specification sheets on its site with vendor news, live audio feeds from trade shows and online interactive seminars.

Late last month, Marshall beefed up its online strategy with an intranet that gives customers and suppliers customized views of Marshall's products, services and inventory, said President and CEO Rob Rodin (see related story at right). Both PartnerNet and the Web site (www.marshall.com) are part of Rodin's vision to let customers buy products anytime and in any form.

Marshall Industries' Barbara Allen *says every company team contributed to building the Web site*

It pays to advertise

"The ads enable us to get mind share," said Emilio Robles, a spokesman at Philips Semiconductors in Sunnyvale, Calif., which has been advertising on the site for about a month. "When people search on 'microcontrollers,' it comes back with our microcontrollers and our competition's microcontrollers. But on the top of the page, it says 'Philips Semiconductors'" in the paid advertisement.

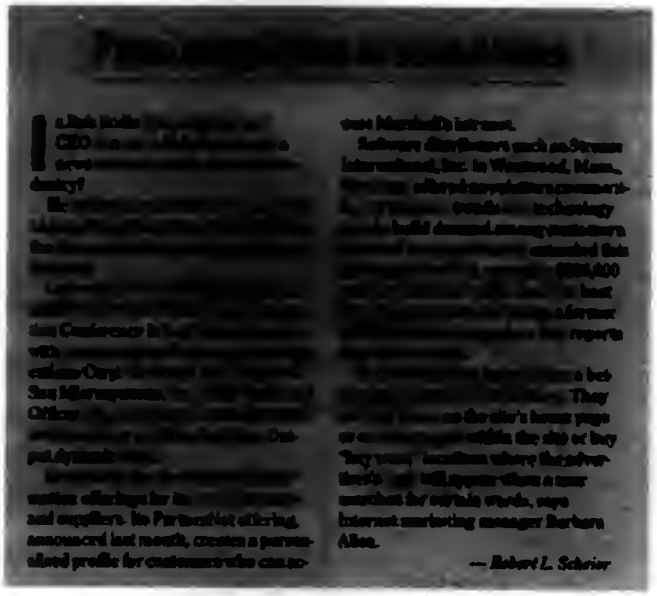


Marshall Industries' Web site *heaps up parts listings with news about vendors and interactive seminars*

It is too early to tell how much business the Web sites could bring in, Robles said, but "there's a great synergistic energy between us and Marshall. They're providing real-time information to customers," making the site s more attractive space on which to advertise.

Rodin said he doesn't try to calculate the number of new customers or new sales the site generates, but he said he is confident it has more than repaid the $1 million in development costs since early 1994.

One recent online seminar attracted 87 engineers from about s dozen countries, he said. Three or four ordered development tools during the session. That is something that rarely happens during s traditional seminar at a botel ballroom, he said.



Key lessons from the Marshall story include the following:

- Make your Web site an integral part of your business strategy, not an afterthought.
- Create the site with cross-functional teams that include representation from not only information systems but also the marketing, legal and even warehouse staff.
- Don't do the site until you have a clear goal for it. At Marshall, its goal was to let customers learn about and buy products 24 hours a day, seven days a week.

The site went live in July 1994, the result of more than a year of work to help achieve Marshall's strategic goal of s "virtual distribution system," said Barbara Allen, Internet marketing manager at the company. During the process, she said, "we've had people from every team inside of Marshall involved." This ranged from the accounting department to the legal department to the shipping department.

Because the Web is just part of a larger "virtual distribution" system, the Web developers didn't create a stand-alone site. Instead, they perform nightly downloads of product, price and availability information on 170,000 parts from a DB2 mainframe database to an Oracle database accessed by the Web server.

HP plays catch-up with debut of Internet security products

By Craig Stedman

Belatedly trying to make its mark on the Internet, Hewlett-Packard Co. in the next few months will start announcing a series of security products aimed at making the online world safer for business uses.

HP admittedly let server rivals such as Sun Microsystems, Inc. and Silicon Graphics, Inc. steal most of the early thunder as the Internet market took off. Now, HP executives want to catch up by tapping into corporate concerns about Internet and intranet security threats.

In a series of announcements starting in the third quarter, HP will unveil smart cards, encryption technology and a secure operating system that lets users build military-class security into their World Wide Web servers, company officials said.

FedEx Corp. is one customer listening closely to HP's pitch. The promised security technology could help FedEx offer Internet-based shipping and billing services on a wider scale than is feasible now, said Robert B. Carter, vice president of corporate systems development at the Memphis-based package delivery giant.

"Today, we basically have it controlled so that you have to be a registered user to make use of [the Internet applications]," Carter said. "We would love to be able to open that up so that anybody with a credit card could ship with us, and we could make sure that it was a legitimate transaction."

HP plans to bring out the following products this year, starting late in the third quarter:

- An operating system/Web gateway combo that doesn't give root users any control, thus blocking a common method used to take over systems. The Virtual Vault product, which is based on custom software acquired earlier in the year, will initially support HP-UX and will later become available for Microsoft Corp.'s Windows NT.
- Smart cards with personal ID numbers that companies could use to limit access to encrypted data or applications on intranets or the Internet. Next year, HP plans to add cards with s built-in compact database, which Informix Software, Inc. is developing, that could store multiple functions such as encryption keys and employee benefits information.
- Portable cryptography technology and a related product, code-named Sugar, that will let systems administrators use encryption keys to prevent end users from loading potentially damaging applets written in Java, Sun Microsystems, Inc.'s development language for the Internet.

FedEx's Robert B. Carter *says company has to be able to authenticate shipping orders and bills over the Internet*

FedEx, which just signed a global purchasing deal for HP products and services, is looking "very strongly" at Virtual Vault as a way to open up Internet access to the public while preventing unauthorized users from breaking into customer accounts and other sensitive data, Carter said.

Sugar also sounds potentially useful as Java applets become more widespread, he added.

HP debuts its 64-bit chips. See page 44.

Micro Focus Challenge 2000 Program

As challenging as it seems, it's a problem that's only going to get more dangerous with time. Today, 20% of business applications cannot handle dates after the turn of the century. By the year 2000 that number will increase to 90%.* Those that aren't converted will fail. The Micro Focus Challenge 2000 Program gives you a comprehensive program of tools and services to fully assess and implement the century date change. Start with the Application Express Offloader™ tool to automatically move the application to a PC. Use Micro Focus' Revolve® Year 2000 analysis tools to inexpensively locate the problem areas. Then, modify the application with Micro Focus COBOL Workbench.® You can even choose to replace your date logic with TransCentury® Calendar Routines. It's quick. It's efficient. It's complete. It's also an effective first step towards reengineering your legacy COBOL applications. After all, fixing a business application should be as quick and painless as possible (right Fido?).

We can train any application to obey the century date change.

See for yourself. Call 1-800-MFCOBOL today for your free Assessment Tool Kit. It provides a complete set of guidelines for structuring your Year 2000 project.

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*Hey don't blame us, we didn't just come up with these numbers. CDC figures are taken from "Three Certainties. Death, Taxes and the Year 2000" by K. Schick of the Gartner Group. Micro Focus and COBOL Workbench are registered trademarks and "A Better Way of Programming" is a trademark of Micro Focus Ltd. Revolve is a registered trademark of Burl Software. All other trademarks are the property of their respective owners.

IBM, Digital boost object-based apps

By Craig Stedman

IBM and Digital Equipment Corp. are racing each other to marry messaging middleware to object request brokers (ORB), a technology union that users and analysts said should make it much more practical to build large-scale applications based on distributed objects.

Linking the two technologies will let ORBs take advantage of the store-and-forward communications approach used by messaging middleware. That approach doesn't require a live connection between systems to send requests for data — or in this case, objects — back and forth.

By comparison, the remote procedure calls typically used by ORBs mandate that a direct connection be established and kept alive until a response is received. That simply isn't flexible enough for object-based applications spread across numerous servers, said Charles Nettles, director of technology at McKesson Corp.'s Information Technologies division in San Francisco.

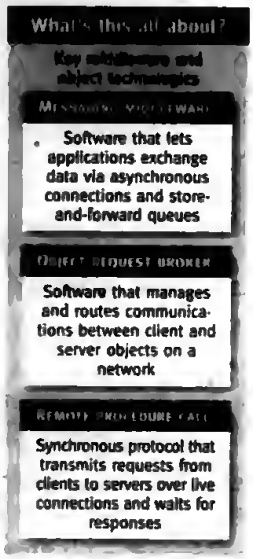
"We could never guarantee equipment at both ends of a transaction being up and running at the same time," Nettles said. "On the scale that we'll be dealing with eventually, I just don't have that luxury."

McKesson, a pharmaceuticals distributor, uses IBM's MQSeries middleware and is keenly interested in the promised linkage with its System Object Model (SOM) request broker, Nettles said. The combo would be particularly useful for a new object-based decision-support system that McKessoo will market to external customers such as hospitals and pharmacies, be said.

Tying an ORB to asynchronous middleware that provides guaranteed message delivery is also important for running object-based applications over intranets and the Internet, Nettles added. "I can't think of a more asynchronous environment than that."

Products such as MQSeries and Digital's DECmessageQ let applications proceed with other tasks while waiting for responses to requests for data from different servers. ORBs need that capability to avoid getting bogged down in vicious send-and-wait cycles, observers said.

"With object-oriented applications, you may have several requests going out at the same time, and you certainly don't want to get all tied up waiting for the replies," said Karen Boucher, an analyst at The Standish Group International, Inc. in Dennis, Mass.


What's this all about?
Key middleware and object technologies
MESSAGING MIDDLEWARE
Software that lets applications exchange data via asynchronous connections and store-and-forward queues
OBJECT REQUEST BROKER
Software that manages and routes communications between client and server objects on a network
REMOTE PROCEDURE CALL
Synchronous protocol that transmits requests from clients to servers over live connections and waits for responses

Building bridges

IBM late last month made a prototype tool kit version of a bridge between MQSeries and SOM available for downloading from its World Wide Web page. The bridge is scheduled to be packaged with a new SOM 3.0 release due out this fall, said Anthony Brown, IBM's manager of object technologies marketing.

MQSeries executives at IBM said they plan later to link the middleware with rival ORBs, such as Iona Technologies Ltd.'s Orbix.

Digital is developing a similar bridge between DECmessageQ and its ObjectBroker software, confirmed Dan Gilfix, business and product manager for the ORB. Gilfix said the bridge will be ready "in the near future," but he wouldn't be more specific.

Concord streamlines early-warning system

By Patrick Dryden

Administrators who reach for Network Health reports with their morning coffee can now scan one-page bulletins on performance anomalies instead of wading through a pile of reports to find problems.

That is one of many requested capabilities that Concord Communications, Inc. included in its major upgrade to Network Health, available this week. The software helps managers automate the monitoring and analysis of network performance.

Mercer's Patrick Brennen says he can 'migrate to a bigger box' when he needs more power

Version 2.5, which starts at $9,995, streamlines the early-warning function that managers need to prevent problems before they cause failures and require frantic troubleshooting.

In a nutshell

The customizable Exception Reports provide detailed views of network anomalies and relevant statistics, distilled from pages of reports.

"With text and trend charts combined on one page, we quickly see all the information we need without requiring other reports," said beta tester T. X. Ho, a senior communications engineer at Chevron Information Technology Co. in San Ramon, Calif.

Beta tester Debby Briggs, a wide-area network consultant at Healthsource, Inc. in Hooksett, N.H., tracks daily utilization of WAN connections and then prints an Exception Report at 5 a.m.

"I've been harping on them to break down reports to show just what is most important to me so I can find and deal with performance issues quickly," said Patrick Brennen, a network operations manager at Mercer Management Consulting, Inc. in New York.

Users are pleased that Concord ported Network Health to run on HP-UX workstations from Hewlett-Packard Co., instead of only SPARCstations from Sun Microsystems, Inc.

Brennen said this lets him "migrate to a bigger box" in his HP shop when he needs more power.

That enables a single view of very large networks without the overhead of constant management traffic.

No other tool offers the automation and report flexibility found in Network Health, said Jim Metzler, consulting services director at Strategic Networks Consulting, Inc. in Rockland, Mass.

News Shorts

GM drives with Compaq

General Motors Corp. has given **Compaq Computer Corp.** the largest server order in the computer vendor's history. Under the contract, Houston-based Compaq will supply 8,500 ProSignia 300 servers that run Windows NT to GM dealers across the U.S. The servers are part of an effort to improve communications and information exchange between GM headquarters and its dealer network. The project will begin in September.

CSC outsources maintenance

Sometimes, even a services firm needs services. Last week, **Computer Sciences Corp.** outsourced maintenance of its desktop-to-mainframe computers to **Amdahl Corp.** under a five-year, $150 million contract. Under the contract, Amdahl will support more than 450 distributed computing sites and mainframe data centers in North America and Asia.

CA licenses GUI technology

Computer Associates International, Inc. announced it has licensed graphical user interface (GUI) technology for AS/400 applications from Client/Server Technology, Inc. in Atlanta. CA said it plans this month to release beta versions of two business management applications, CA-PRMS and CA-Warehouse Boss, that will include new GUIs.

Micro Focus loses $13M

Micro Focus said last week it lost more than $13 million in its first fiscal quarter, ended April 30. The Cobol compiler vendor, whose U.S. operations are in Palo Alto, Calif., said $8 million of the loss was a restructuring charge for shutting down facilities and laying off about 65 people, roughly 8% of its 700-person workforce. Revenue for the quarter was $24.2 million, down from $28.7 million a year ago.

Baan aims for big projects

Baan Co. has tailored its Unix-based Baan IV software for the large projects industry. Users and analysts said the Unix-based software package could significantly reduce lead times and cut costs for manufacturers of complex, engineered-to-order products, such as a one-of-a-kind turbine or cargo ship. Baan's mega-projects software, now available, costs between $4,000 and $6,000 per concurrent user.

Tool vendors to merge

Pure Software, Inc. and **Atria Software, Inc.** said they will merge by the end of September. Pure Software in Sunnyvale, Calif., makes tools for testing newly developed applications. It will pay about $970 million in stock for Lexington, Mass.-based Atria, which makes products for managing the development process. The new company, Pure Atria Corp., will be based in Sunnyvale and will keep Pure Software's Reed Hastings as its CEO, the companies said.

Apple tussles with IRS

Apple Computer, Inc. and the **Internal Revenue Service** are tangling once again. The IRS claims that Apple owes back taxes in excess of $140 million for 1989 through 1991. Apple disputes the claims — which center around systems sold in the U.S. but made in Ireland — and has filed suit. The two are set to go to court next April if they can't reach an agreement. Just last fall, Apple settled an even bigger dispute with the IRS that could have resulted in Apple paying more than $1 billion.

SHORT TAKE Under a restructuring program at **Mobil Corp.**, Michael P. Ramage was named operating officer at the Fairfax, Va., firm's technology group.

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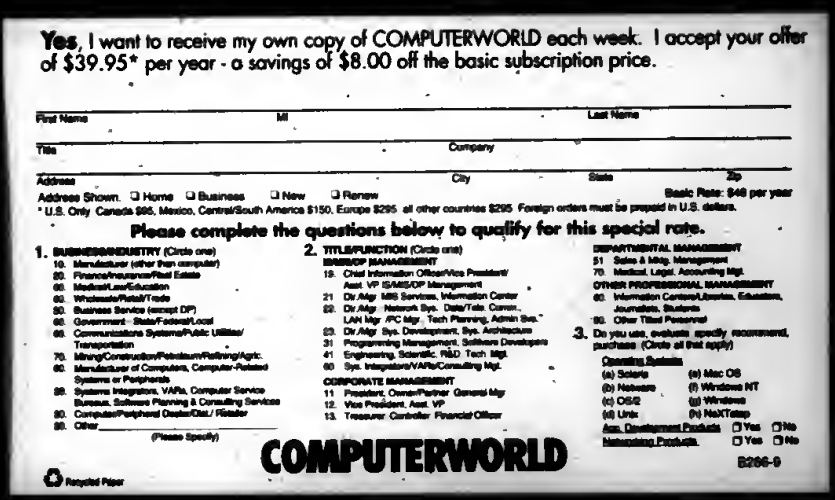

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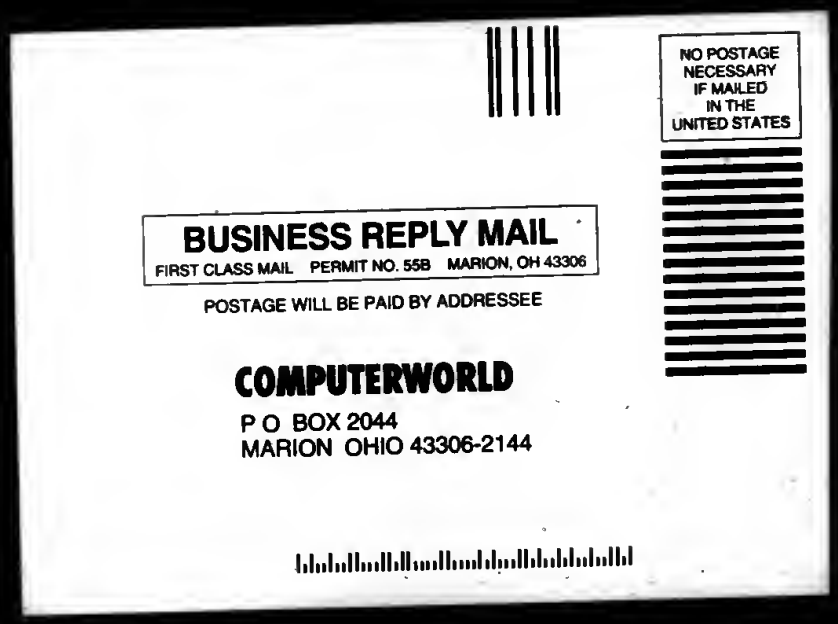

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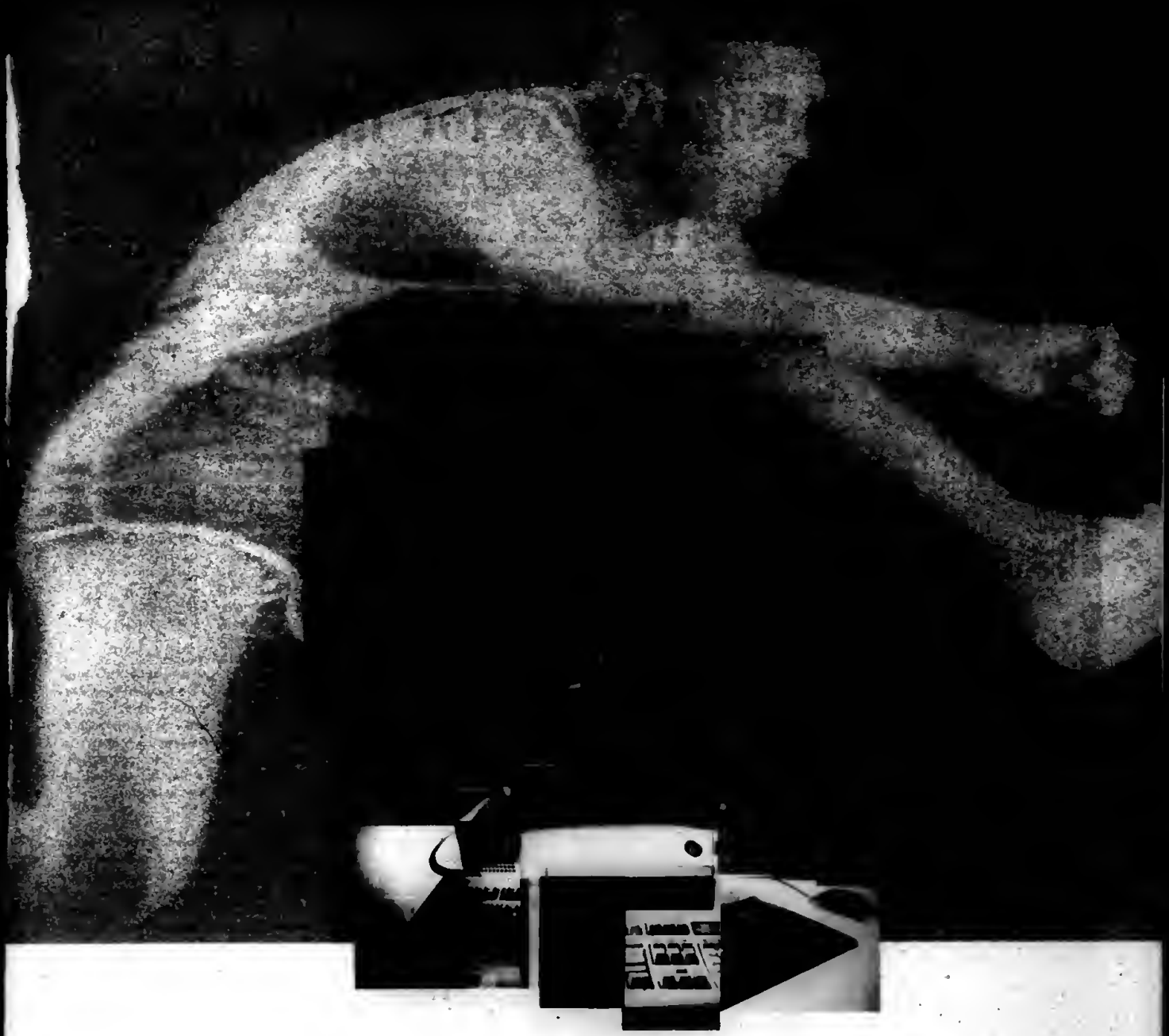

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Microsoft designs keys for 'net security

Features to be embedded in Web browser, NT

By Gary H. Anthes and Laura DiDio

Microsoft Corp. last week announced a comprehensive framework for secure Internet use, including electronic commerce.

The new features will appear later this year in Microsoft products such as the Explorer World Wide Web browser. The features eventually will be embedded in the Windows and Windows NT operating systems. They combine public key cryptography and password technologies.

The framework, some elements of which have been announced in the past few months, builds on Windows security features but will adhere to Internet standards. Microsoft officials said the framework will be interoperable with other vendors' products, such as Netscape Communications Corp.'s Web browser.

Steve Sommer, vice president of MIS at Hughes Hubbard & Reed, a New York law firm, called the framework a "one-stop shop for Internet security." He said he is especially pleased that the initiative builds security into the Windows NT environment.

"If I'm using the Internet, I don't want to think about security, and I also don't want to stand the added time and expense of buying and testing various security add-ons," Sommer said. "Microsoft's Internet Security Framework will help alleviate that problem."

In public key cryptography, each user has a public and a private encryption key. The sender of a message uses the recipient's public key to encrypt a message, and the recipient uses his private key to decode it. This also can be used to create tamper-proof digital signatures that authenticate users and ensure message integrity.

Secure traffic

The Microsoft Internet Security Framework includes several previously announced components. For example, it includes code-signing, which allows software to be distributed securely over the Internet, and the Secure Electronic Transaction protocol for credit-card use on the Internet.

At the foundation of the Microsoft framework are cryptographic application programming interfaces. The firm announced CryptoAPI 2.0, which extends the functions in the CryptoAPI 1.0 that now ships in the Internet Explorer 3.0 beta and Windows NT 4.0 beta. The new release supports certificate-based authentication, certificate management and digital signatures.

A certificate is a digital document that proves that a person who presents a public key owns that key. The certificate is trusted because it is digitally signed by a trusted party called a certification authority.

Other components include the following:

- Certificate Server, which sits on top of CryptoAPI and issues and manages certificates under user-specified policies.
- Digital Wallet, which holds a user's passwords, credit-card numbers, certificates, private keys and other vital data for electronic commerce. The contents of the wallet are encrypted; in this way, the contents can be safely stored. Digital Wallet will appear in Internet Explorer Web browser later this year and eventually will be integrated with Windows.

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SAP AG dresses up R/3 for retail customers

By Julia King

SAP AG is preparing to crack the multibillion-dollar worldwide retailing market with a major new version of its R/3 enterprise software, *Computerworld* has learned.

The Disney Store and Nash Finch Co., a food wholesaler with 115 stores, are due to receive the package by year's end. General availability of SAP Retail is scheduled for early next year.

Nash Finch is in the early stages of looking at the software, said Patty Dill, the company's director of future systems.

So far, the software's strong areas include financials, order management and sales and distribution, she said. "But we won't use their warehouse system because we need a more sophisticated system and will use a third party," Dill said.

Home Depot CIO Ron Griffin: *'You'd have to put a turbocharger on [R/3] to handle our transaction volume'*

Tough to tell

Analysts regard SAP's move into the highly volatile and quirky world of retail as dicey. R/3, which has its roots in manufacturing, is a tightly integrated system that is hostile to on-the-fly configuration changes.

Retailers, by contrast, operate in a fast-paced world of "blue light" specials and one-day sales.

"Retailing is an entirely different business. Once you establish processes with manufacturing, you don't have to change much. But each retailer has different processes that are very customer-driven," said Tom Friedman, editor of "Retail Systems Alert," a newsletter in Newton, Mass.

Systems performance is another concern with client/server systems in general. Some retailers worry that R/3 would buckle under the weight of thousands of transactions a day.

"We looked at SAP, and some of our concerns were around performance," said Ron Griffin, chief information officer at $16 billion Home Depot, Inc. in Atlanta.

"We have 30,000 customers a week in 445 stores and will add another 450 stores over the next four years. You'd have to put a turbocharger on [R/3] to handle our transaction volume," he said.

But John Nelson, director of SAP's retail center of expertise in Chicago, said a team of 80 retail experts — as opposed to software developers — has been working on these issues since 1994, when SAP acquired Dacoss, a German retail consultancy.

The group has developed, among other things, more than 300 retail-specific business processes, which will be part of SAP Retail. These include the ability to funnel point-of-sale data from stores directly into an R/3 enterprise system.

SAP also has been stress-testing R/3's overall system performance in conjunction with Metro AG, a $43 billion European retail and wholesale empire, which processes its financial transactions under R/3.

"I'd challenge anyone to find higher volumes than Metro's," Nelson said.

IS managers place high value on online services

By Mitch Wagner

While pundits question the future of proprietary online services in the open-standards age of the Internet, information systems managers say online services are valuable venues for building sites that attract consumers.

Proprietary online services have experienced explosive growth in recent years, but some question whether Internet technology will make them obsolete.

"If I develop a site on the Internet, then the number of users I can reach increases substantially," said Brad Meinert, an analyst at Input. "Why should I limit myself to just the customers on one online service?"

Race to the 'net

Indeed, online services are scrambling to embrace the 'net. Last week, CompuServe, Inc. announced plans to license Microsoft Corp.'s Normandy server, a Windows NT software package designed for Internet service providers and online services.

The Columbus, Ohio, online service will use Normandy to migrate content to the Web, with the first significant elements to go live in late fall, said Kevin Knott, vice president of strategic planning and development at CompuServe.

CompuServe also said it will license the Microsoft Explorer World Wide Web browser, and Microsoft will put an icon for CompuServe on the desktop for Windows 95. That will put CompuServe access just a mouse-click away for users. America Online announced a similar browser-and-icon deal in March.

But CompuServe and AOL are far from irrelevant, information systems managers say. Those services have a broad appeal to consumers that matches, or perhaps exceeds, the Internet.

"Online services such as CompuServe and AOL provide a training ground to people new to the online world," said Catherine Graeber, senior vice president of interactive banking at Bank of America NT & SA. "There is a comfort feeling to the point-and-click environment. We need to be where the consumers are."

Tom Kelly, spokesman for First Chicago NBD Corp. in Chicago, agreed. "There's such a mass of customers that you don't want to give up," he said.

The simple act of setting up an Internet account can be overwhelming for users, said Marvin Chow, interactive marketing manager at Reebok International Ltd.

Reebok has its own Web site and is planning to place offerings on AOL and CompuServe.

Quick Poll: Are proprietary online services relevant? See www.computerworld.com.

Microsoft announces Normandy Internet server

- Designed for Internet service providers
- Offers dial-up access to functions such as the Web, newsgroups and Internet mail
- Automates billing for customers
- Runs on Windows NT
- Preliminary versions available late this summer; final version available fourth quarter

Sybase joins the text management parade at last

By Dan Richman

Sybase, Inc. on Tuesday will become the last of the three major relational database management systems vendors to say how it will let users manipulate and search text.

Sybase will announce it has licensed TopicSearch, a text-search engine from Verity, Inc. in Mountain View, Calif. The company plans to integrate the engine into the next version of its SQL Server RDBMS, which is slated to enter beta testing this fall, said David Hsieh, Sybase's vice president of enterprise product marketing.

Rival Informix Software, Inc. recently said it, too, will license TopicSearch. Oracle Corp. is the only vendor already shipping an integrated text-search engine, developed internally.

Relational DBMS

To many users, text is the most important type of nontraditional data that all RDBMS vendors are racing to deal with in forthcoming versions of their products.

"We already use both TopicSearch and Sybase, but using them together requires brute force. This will make it streamlined, so users can search for a given word or phrase no matter which field it's in in some database," said Dan Woods, applications editor of Pathfinder, a Web site produced by Time, Inc. New Media in New York.

"Sybase is last with its text management plans, but sometimes it pays to be last," said Brian Kent, CEO of Inspired Arts of San Diego, a Web site management company. "TopicSearch works no lots of platforms, and with Sybase's middleware, it's a marriage that will be very flexible and powerful."

Users ambivalent?

The drive to handle objects — text, audio, video, Web pages and other data besides numbers and character strings — is the strongest competitive imperative in the database industry today. But vendors may care more than users.

"Object strategy? I'm not sure that has much to do with us," said Sybase user Cecil Jarmer, an information technology manager at Providence Health System in Portland, Ore. "We're just making the transition from 3GL to 4GL and from character mode to GUI, and it's a slow, hard struggle. We just don't need objects yet."

But for Sybase as a company, objects are critically important. Sybase's reputation for technical prowess has been tarnished by reports of bugs and nonscalability in Version 10 of SQL Server. The company lost $6.9 million in the quarter ended March 31, and analysts say only strong sales of SQL Server 11 can help.

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IBM users clear Windows plan

Multiplatform support seen as inevitable

By April Jacobs
CHICAGO

Call it inevitable, or just call it common sense, but when IBM embraced the Windows and Windows NT platforms last week at Comdex/Spring '96, it was no surprise to its customers or analysts.

IBM, which has long skirted the issue of Windows support, said it will offer the appropriate Windows and Windows NT versions of software in the development, data management and document management arenas. Many releases are scheduled for delivery this month [CW, June 3].

Operating systems

The nitty gritty

Among the specifics IBM laid out were the following:

- In the development area, the company will put VisualAge for Cobol, C++ and Basic on Windows and VisualAge Generator, TeamConnection and its OpenDoc beta version on Windows 95 and Windows NT.
- In the data management area, the company released an enhanced version of its DB2 product for Windows NT and a single-user DB2 for Windows 95. It also added Adstar ADSM Version 2.1 to the list, with support for Windows NT Server, Windows NT and Windows 95.
- Its document management products — FlowMark, ImagePlus and Visual Info — will have Windows versions. The three products were originally released for IBM's OS/2 platform.

IBM also will offer its Database Server on Windows NT.

One possible impetus for what many see as a long-overdue move might be IBM's and Lotus Development Corp.'s acquisition of scores of Windows users in the desktop market.

OS/2's traditionally loyal users appear to be unperturbed by IBM's newly aggressive support for the rival Windows and NT.

"It makes sense to me," said James Stuyck, a member and retired leader of the 650-member Dallas/Fort Worth OS/2 Users' Group.

"I'm also a stockholder of IBM, and I can't fault them for releasing software for every platform where they can make money. And just because they're releasing [software] on Windows doesn't mean they're abandoning OS/2 users," he said.

"They have to be cross-platform if they're going to do software," said Richard Miles, manager of technical services and information systems at Prentiss Properties, a commercial real estate firm in Dallas.

IBM opens the Windows

IBM says that these products will support Windows, Windows NT or Windows 95

SYSTEMS MANAGEMENT PRODUCTS
Tivoli Plus
TME
SystemView

APPLICATION DEVELOPMENT
VisualAge
Team Connection
OpenDoc

TEAM COMPUTING
Lotus Notes
Lotus SmartSuite
FlowMark
Visual Info

DATA MANAGEMENT
DB2
Lotus Approach
Data Joiner
Data Mining
Visual Warehouse
Digital Library

Miles said he had production servers that run OS/2, and he uses primarily IBM hardware. But Prentiss also has desktops with Windows 3.1. He said he is looking at Windows NT, too.

"In corporate information systems, we have to support, not some, but all of these platforms because we'll bring in whatever solution meets the needs of the business," Miles said. "The reality of it is that I don't get to pick and choose, and I'm going to end up supporting a bit of all of this."

His message to IBM: "Provide me with applications that run across platforms. Let's not have OS/2 be a religious issue."

The right stuff

Joel Diamond, technical director at Wugnet, an online Windows users group, said he sees IBM's move as an attempt to get into the value-added hardware and software market.

Longtime OS/2 supporter William Zachmann, president of Canopus Research in Duxbury, Mass., said the move is purely common sense.

"Obviously, lots of people use Windows. It has dominant share on the desktop, and there is a high level of interest for Windows NT on the server, as well," he said. "If you want to sell software and want to cover the waterfront the way IBM does, Windows is one of the platforms you've got to cover."

As for the OS/2 market, Zachmann said OS/2 isn't going to stand or fall based on whether IBM supplies Windows tools or applications.

"The fact of the matter is, IBM is selling to a broader market, and OS/2 has not gone away," Zachmann said.

IBM brings Windows to the mainframe. See page 49.

Springtime show comes in like a lamb

The weird and wacky from this year's expo

By Computerworld staff
CHICAGO

Arguably the quietest Comdex/Spring ever, this year's show was rife with vendors that seemed to say, "Wait a couple of weeks until we hit PC Expo. Then we'll show you something."

Of course, the show did offer attendees a wide variety of products, including wireless networking technology, desktop software and a host of strange giveaways.

*****

As they looked through a copy of the Windows World at Comdex/Spring '96 brochure while they ran off to see a demonstration, some users began to discuss not what excited them, but their frustration with the term "intranet." "What does that mean, anyway — a new way to waste time at your desk?" one user asked.

*****

Other users seemed unimpressed with a display of high-speed computing. At its Windows World booth, Digital Equipment Corp. set up three rows of some of its fastest computers to run hands-on demonstrations of products. But the speed appeared to be wasted on the application demonstrations. Many audience members were playing solitaire on the Pentium Pro machines, while the pitchman navigated his way through the demonstration. "Whatever makes them happy," said a Digital employee watching from nearby.

*****

What didn't make many attendees happy were the lines for taxis, which stretched for what seemed an eternity, and the hour's wait.

But attendees were even less happy about the tour they had to take through a mazelike construction site to reach the trains, which actually seemed to be running on time.

*****

About the best thing on the show floor was foot and shoulder massages from On-site Bodyworks. The going rate was $12 for 10 minutes and $20 for 20 minutes.

Oh, and because nothing these days matters unless it is online, On-site Bodyworks has an electronic-mail address, onsite4@aol.com.

Comdex Weirdos Award: To Ifusioncom, which used its booth space to create a display devoted to a giant psychedelic blob called Papilio Internetus Morpho Blosanmus.

Ifusioncom had no one there other than a "security guard" who handed out postcards that contained the company's Internet address, a picture of a newborn about to get introduced to the world and the slogan, "If the Internet is the birth of a new industry, we're the slap on the ass."

*****

Favorite giveaway: Iomega Corp., which passed out buttons that offered clever phrases starting with "I." Among them were "I byte," and "I am the artist formerly known as Prince."

New multimedia notebooks debut. See page 43.

Reaping remote rewards

Mobile workers help bottom line

By April Jacobs

Mobile computing software and hardware might be somewhat expensive, but companies may get their money back if their employees take work home or on the road.

At Comdex/Spring '96 last week in Chicago, Rob Enderle, an analyst at Giga Information Group in Santa Clara, Calif., said companies can expect to pay $6,100 to $7,800 more than what a desktop setup would cost over three years to support a mobile professional.

But he said the benefits companies can reap in increased productivity can amount to more than double what it costs to supply laptops vs. desktop PCs.

Enderle presented a survey of information technology professionals about the costs associated with mobile computing. Giga conducted the poll in May.

Enderle's figures take into account the cost of acquiring the laptop and supporting it, which averages about $100 per month, he said.

"It's soft dollars, so it's hard for the IT organization to measure," he said, because much of what firms will realize is in productivity.

Money well-spent

Is it worth it?

"Absolutely," Enderle said.

If a professional works an extra two hours per week at home or on the road, a company could realize an additional 100 hours of work per year. Based on an average rate of pay for a professional of $50 per hour, that means about $5,000 per professional per year in additional work supplied.

According to the Giga survey, mobile workers use their systems an average of 2.8 hours per day when away. And they are away 67 days per year, or an average of 3.75 hours per week.

Enderle said companies that are looking into providing laptops for employees may want to consider sharing the cost of the machines because it reduces the lifecycle cost of the unit, and people are more likely to take care of something they own.

PC Expo to highlight Web, mobile trends

By Stewart Deck

Attendees at next week's PC Expo in New York will get their fill of the World Wide Web and applications for mobile users.

While attendance seems to be slipping at some trade shows, PC Expo organizers said they expect the June 17-20 event to match last year's record-breaking figure of 131,000 visitors and draw the most exhibitors in the show's history.

Web technologies will hog most of the limelight. **National Internet Source, Inc.** in Ramsey, N.J., will show off WebFalcon, a new tracking system that blends statistics and information from Web site forms into a database of visitor demographic information.

Maximum Information, Inc. in San Francisco will preview an enterprisewide Web management system that helps users publish and maintain thousands of pages of content on multiple sites.

Lotus Development Corp. plans to expound on the Web capabilities of Notes 4.x, especially with Domino, the native Hypertext Transport Protocol Notes server that is in beta testing. The Cambridge, Mass., firm wants to show that Notes can be used as a groupware tool and for Web page management.

Traveling Software, Inc. in Bethell, Wash., will combine both show themes in demonstrating its WebEx product, an Internet application that works with Web browsers to provide off-line Web access.

Fujitsu PC Corp. in Milpitas, Calif., will enter the notebook market with three aggressively priced notebook lines (see photo below).

Pricing for Monte Carlo, *Fujitsu's new multimedia notebook PC, starts at $3,299*

Compaq Computer Corp. plans to introduce Armada, a notebook PC with a slim-line design. **Texas Instruments, Inc.** will announce an expansion of its notebook line.

Off the show floor, **Microsoft Corp.** is going to deliver briefings on a forthcoming version of its best-selling Office suite of desktop applications that will add intranet-specific features and facilities.

For PC server vendors, PC Expo will be a time to show off recently announced Pentium Pro systems designed for Windows NT Server-based applications. Market leaders **Compaq, Hewlett-Packard Co.** and **IBM PC Co.** have announced new four-processor PC servers that will ship shortly after the PC Expo tent folds.

PC vendors will demonstrate the latest version of the **Intel Corp.** Pentium processor, a 200-MHz chip, in their desktop systems. Vendors will also show an array of Pentium Pro workstations, high-end desktops designed for 32-bit applications.

Now that **IBM's** noncompete agreement with printer manufacturer Lexmark International, Inc. has expired, IBM will enter the network printer arena by announcing three monochrome printers and one color model.

Seafirst does.
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DEC channels

CONTINUED FROM PAGE 1

tatives. Digital is expected to clear up some of the mystery this week when it formally rolls out a sweeping reorganization plan that may trigger a fresh round of layoffs. The news sent Digital stock tumbling 6% late last week.

Meanwhile, last week, there was plenty of speculation about what Digital will do. A Digital executive and two analysts said the company may reduce the number of directly and wholly served accounts to about 300. That is down from the current 1,000 large customers. This in turn represents a drastic reduction of the 10,000 or so customers Digital directly served two years ago.

An executive from Digital's Internet Business Unit also confirmed that a move toward the indirect channel was under way.

But a second, higher-ranking Digital executive insisted that there was no move to reduce the number of direct accounts.

Channel focus

Harry Copperman, vice president and general manager of Digital's Systems Business Unit, said that as part of the reorganization, the company will, in fact, increase the number of accounts directly covered by a Digital account manager. He said channel partners — such as dealers, value-added resellers and systems integrators — will become much more involved in order fulfillment and coverage.

Joe Pollizzi, the vice president of the U.S. chapter of Digital Equipment Computer Users Society, Digital's user group, welcomed the move to assign representatives to more accounts.

"I think it is a wonderful idea to have a representative assigned to act as a sort of information conduit between Digital and these customers," he said.

The part that was really missing for a lot of the smaller and medium-size companies was any kind of reliable information flow from Digital about its products and strategies, Pollizzi explained.

But Terry Shannon, editor of "Shannon Knows DEC," a newsletter in Ashland, Mass., said, "Some of the larger accounts that suddenly lose their most-favored status aren't going to be very amused." He said 59% of Digital's sales come through indirect channels. "The overall impact of any such move is likely to be mainly psychological, however. Digital has some pretty capable partner coverage out there," he said.

Senior writer Michael Goldberg contributed to this report.

Pentium line tops out at 200 MHz

Intel preps for next generation; will direct corporate users toward 'Pro' family

By Bob Francis

The Pentium is dead. Long live the Pentium.

That will be Intel Corp.'s rallying cry this week as it crowns its Pentium line of processors with the 200-MHz version.

The 200-MHz chip is the last of this line of Pentiums. The next generation uses the multimedia extension instruction set and will be aimed primarily at consumer and small-business applications.

New tack

Intel and its PC manufacturer groupies are shifting corporate emphasis to the Pentium Pro, which is rapidly dropping in price to attract corporate users.

The price of these Pentium Pros dressed for corporate success starts at just under $3,000 and is expected to drop below $2,500 by year's end.

The 200-MHz Pentium will be priced just below current Pentium Pro prices, it will cost less than $3,000 for a fully outfitted system.

But as this shift from Pentium to Pentium Pro occurs, other important decisions are taking place in the software court — where Microsoft Corp. rules.

The Pentium Pro was designed for 32-bit applications and awaits the arrival of Windows NT 4.0.

Users are left to wait while this chicken-and-egg situation plays itself out.

"The prices are great on Pentium Pro, but there's no real compelling reason to change over all your systems until we see what we can do with NT on the desktop," said Janet Fowler, an information systems consultant at Du Pont Co. in Wilmington, Del.

Some PC manufacturers are easing the transition by offering Windows NT 3.51 with a free upgrade to 4.0. Dell Computer Corp. in Austin, Texas, and Hewlett-Packard Co. in Palo Alto, Calif., are making that offer to users.

Others such as Advanced Logic Research, Inc. in Irvine, Calif., are offering step-by-step instructions to help users decide whether to use the Pentium or Pentium Pro.

Still, some systems manufacturers are chomping at the bit, wishing the transition to 32-bit software would come sooner rather than later.

"We're left essentially selling [Pentium Pro] systems for software that isn't there. That's not an easy thing to do," said one product manager at a PC manufacturer who asked not to be identified.

Users snub firewall option for hubs

CONTINUED FROM PAGE 1

Among the shortcomings of these latest firewalls are high costs, lack of interoperability and an inability for them to be used as stand-alone systems at central sites.

For example, although vendors promise users enticing cost reductions by adding firewall software to routers rather than having to buy and manage stand-alone firewall products at central and remote sites, users see things differently.

> "Adding things to already-busy switches builds you one gigantic and expensive-to-expand box performing too many tasks."
>
> — Bob Currier, Duke University

"I'd be creating a single point of failure for my network and inviting major problems by running the software on the router that's already anchoring my enterprise network," said Jim Fay, director of strategic technologies at PMI Mortgage Insurance Co. in San Francisco. "If I had security problems at remote sites, I'd have to take that router down, which would disrupt my entire network."

Fay isn't alone in his views.

"I want my enterprise switch doing enterprise switching and not extra tasks like running firewall security for the company," said Bob Currier, director of data communications at Duke University in Durham, N.C. "Adding things to already-busy switches builds you one gigantic and expensive-to-expand box performing too many tasks."

And once you've done that, it becomes nearly impossible to take that device off-line for any reason, Currier added. "I'd much rather buy a low-end workstation running stand-alone firewall software and keep that function separate," he said.

While Cisco Systems, Inc. and 3Com Corp. emphasize stand-alone systems at central sites, Ascend and Bay don't.

Less expensive

As for price, Ascend in Alameda, Calif., and Bay in Billerica, Mass., correctly stress that the add-on software approach is cheaper than stand-alone firewalls on workstations, but firewall security is still too costly for the masses.

For example, adding firewall software to Ascend's lowest-end $1,295 Pipeline 500 remote-office box will cost users $500, which may be tough to swallow at small sites, for which the equipment was priced low to begin with.

And at a headquarters site, adding firewall software to Ascend's central-site $11,000 Max 4002 or $15,500 Max 4004 box will cost $4,000.

Firewall security concerns

- Addition of firewall software can overburden central site routers
- Today's firewalls don't interface with multiple vendors' wares
- Functionality varies by vendor
- Dearth of firewall functionality in remote access servers
- Software options can be expensive

"Anything over 25% of the price you paid for the box is pretty substantial," Fay said.

Ascend, Bay and others are pushing networkwide internetwork security because they acknowledge that it is possible to hack in to their remote gear at small offices and then get through a firewall at a central site.

Analysts say hacking goes beyond routers with firewalls.

"If I'm a hacker, I'm going to look at every option to hack in to a network, not just at routers," said Mike Zboray, research director for network security at Gartner Group, Inc. in Stamford, Conn.

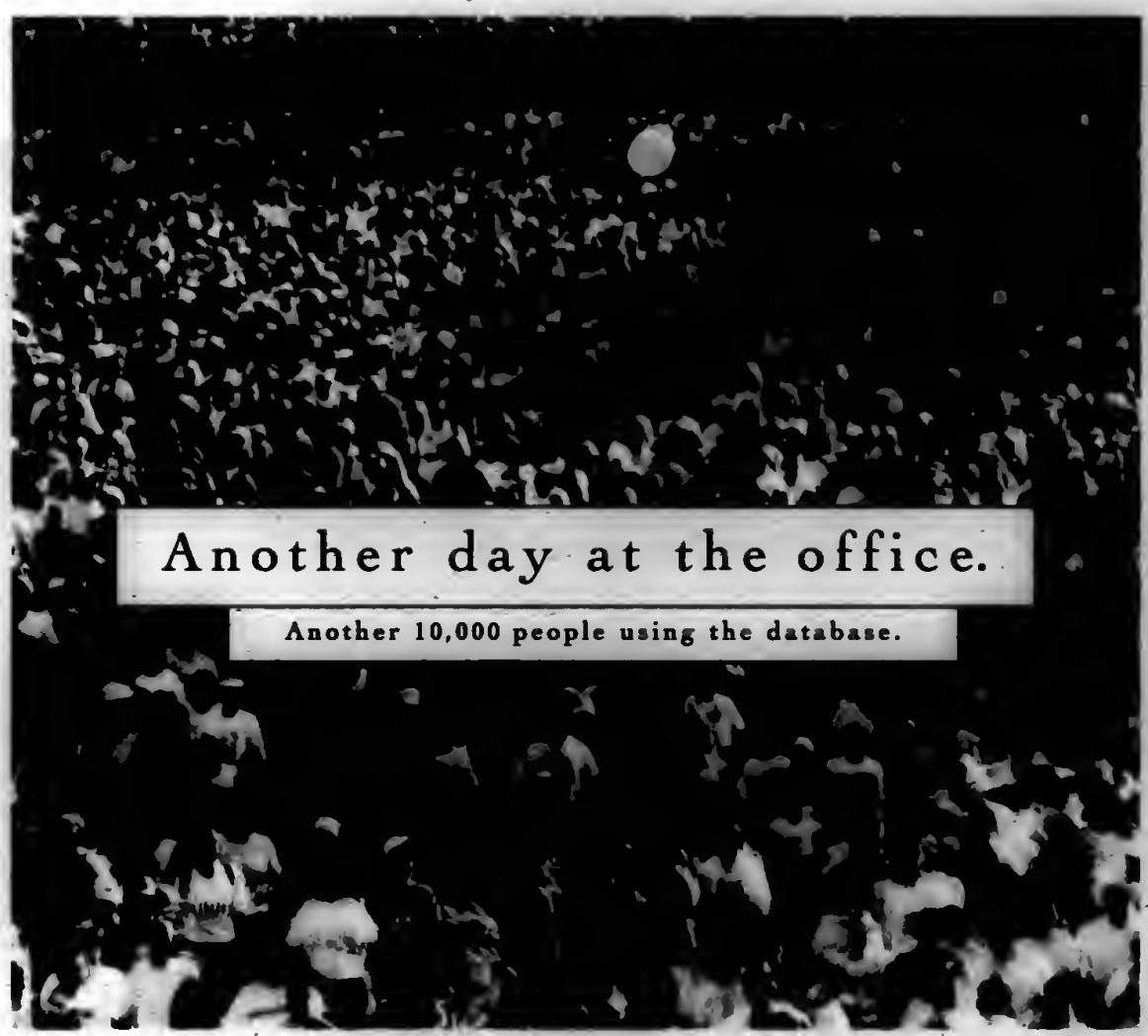
"It's relatively easy to hack in to remote access servers," he said. Adding firewalls may just discourage or redirect hackers as opposed to thwarting them.

Vendors should add robust firewall technology to remote access servers and try to find a way to make the software interoperable, analysts said.

The lack of firewall interoperability means firms with equipment from multiple vendors are left out in the cold for now. "There's not a lot we can do for them now," said Bernie Schneider, marketing vice president at Ascend.

George Spenser, manager of network operations at Unihealth of America in Mission Hills, Calif., said he is thankful his company is a single-vendor router shop.

"It really makes life a lot easier and means I don't have to fight fires with multiple vendors," he said.



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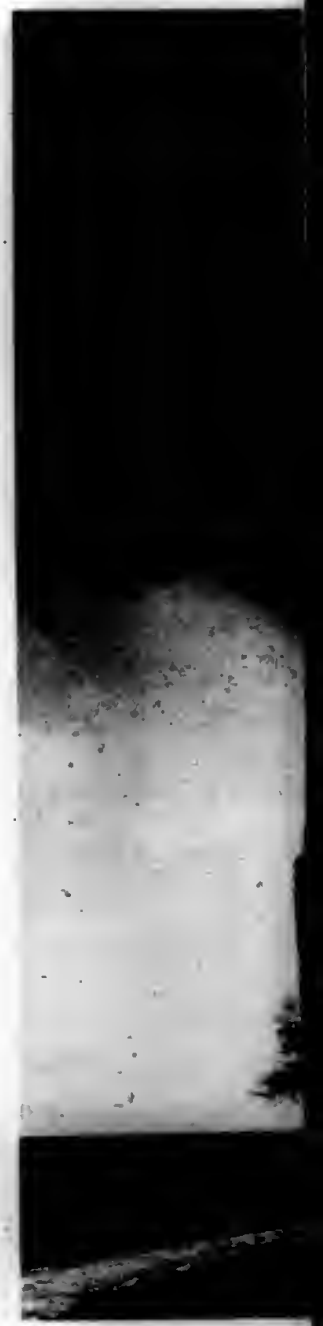

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Has It Changed Your Life Yet?

IBM adds Internet features to AS/400 upgrade

Operating system allows browser access, incorporates security features

By Michael Goldberg

IBM will give AS/400 users a lift onto the World Wide Web this month with a much-anticipated operating system release designed to make the popular business computer Internet-friendly.

Version 3, Release 2 of the OS/400 operating system, available June 21, will make it possible for users to view AS/400 data through any Hypertext Markup Language browser, such as Netscape Communications Corp.'s Navigator.

The new OS/400 version will support the Serial Line Internet Protocol connectivity standard and will contain Internet security features for encrypting data and regulating access to AS/400 systems, IBM officials said.

IBM is also expected to add AS/400 support for other Internet standards, such as Point-to-Point Protocol, in the coming year.

Bob Cargill, a systems manager at Oriental Trading Co., said his catalog sales firm has been waiting for Internet capabilities on the AS/400 and that he hopes to use either IBM's technology or an offering from I/Net, Inc. in Kalamazoo, Mich. The company has been using a Windows NT server to support its Web page.

Closer look

"We're looking ... to allow our customers the capability to access order information and possibly enter orders and get order shipping status on the Internet," Cargill said. "Now that the capability has come in-house [on the AS/400], that's why we're really looking at it closely."

IBM repriced its AS/400 storage subsystems, cutting costs on 2G- and 4G-byte disk arrays to bring them in line with Unix storage. The firm is also making software available to convert AS/400 storage systems to Unix.

Last week's announcement "is a big important step" for AS/400 users, said Dave Andrews, managing partner at D. H. Andrews Group, Inc., a consultancy in Cheshire, Conn.

The AS/400 division has worked quickly to adopt Internet features as part of "an obsession" by IBM management with network computing, Andrews said.

At the same time, IBM needs to support even more emerging Internet standards, such as Secure Sockets Layer protocol, to encrypt transactions over the 'net.

Features galore

In addition to the OS/400 features, IBM plans the following:

- A Notes port to the AS/400, made through the Integrated PC Server, an Intel Corp. processor board inside the system.
- Windows 95 client access, available through a software suite called Client Access/400.
- Increased data warehousing capabilities for the DB2 database on the AS/400.

IBM also introduced a $750 "open systems conversion kit" for its AS/400 9337 storage subsystems that makes the disk arrays work with either AS/400 or Unix servers. Prices announced last week also bring costs for the 9337 in line with IBM's 7137 disk arrays designed for Unix systems.

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Java pitched to wake up management tools

By Patrick Dryden

Hoping to perk up the manageability of enterprise networks, SunSoft, Inc. and more than a dozen other vendors recently pledged to build interoperable tools based on Sun Microsystems, Inc.'s Java programming language and a newly defined management interface.

That means central administrators and remote support staff alike could run applets from any browser-equipped desktop to manage network devices, systems, applications and users over the Internet or a private intranet.

Efforts to extend management software control through the 'net are limited. Vendors are forced to adapt report functions to the text- and forms-based interface enabled by the World Wide Web or to attempt direct manipulation of management data.

Soon, vendors and in-house developers will be able to turn to the Java Management application programming interface (API) due soon from SunSoft in its Solstice WorkShop tool kit. These functions provide a common ground to create the kind of interactive management that is possible through proprietary management consoles.

"The Java Management API promises a much more cohesive environment, standardized for anyone to build tools," said John McConnell, president of McConnell Consulting, Inc. in Boulder, Colo.

He said he expects late next year to see a critical mass of applets that integrate via the Web "instead of the current balkanized set of split-up applications."

Check it out

See a demonstration of the Java management APIs at www.sun.com/solstice/products/workshop.html

Promoters of the Java Management API include Bay Networks, Inc., 3Com Corp., BMC Software, Inc., Cisco Systems, Inc., Computer Associates International, Inc., Compuware Corp., IBM/Tivoli, Legato Systems, Inc., Novell, Inc. and Platinum Technology, Inc.

"Now vendors of network devices and all kinds of systems are more likely to enable their products to respond to enterprise management systems," said Peter Norwood, director of strategy at the Tivoli Systems, Inc. division of IBM.

Web reporting for some tools that manage the global network for Texas Instruments, Inc. has been helpful. "But this sounds like a step beyond," said Blair Sanders, senior member of the technical staff at TI in Dallas.

"Java applets should enable remote configuration and more dynamic information exchange," Sanders said. "And maybe vendors won't be so far behind in supporting all the different clients we need to access their management servers."

Many vendors already working with the Java Management API are expected to ship applets to support remote interaction with their products in the third quarter, said Brian Biles, marketing director for enterprise network products at SunSoft in Mountain View, Calif. In-house developers can get the Solstice WorkShop tool kit this fall.

HP middleware fetches data from Java-enabled clients. See page 50.

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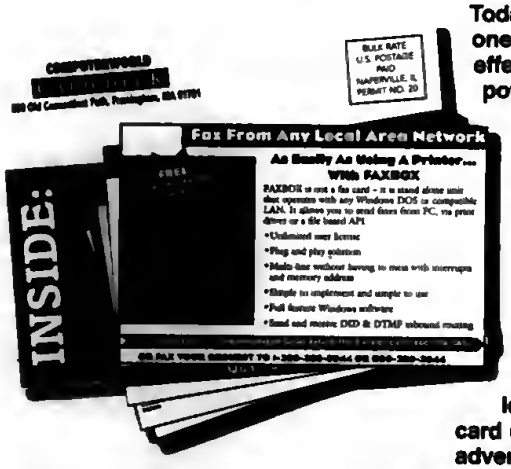

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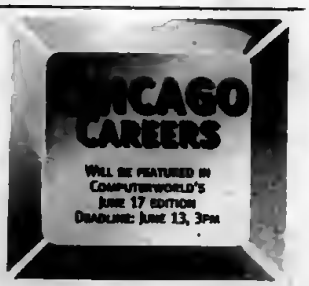

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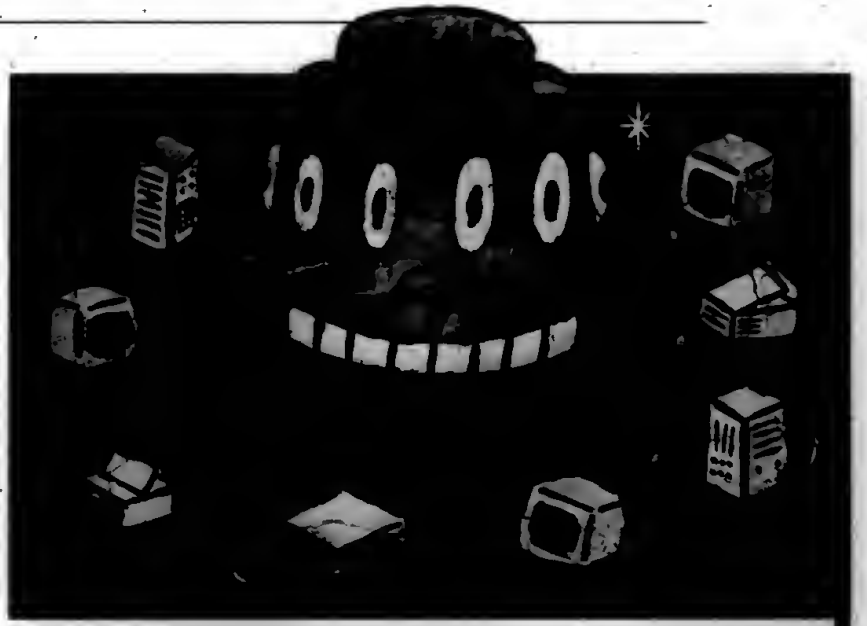

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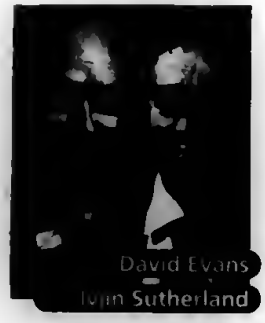

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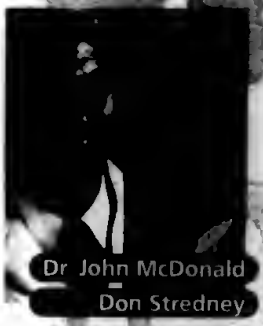

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90. Other Titled Personnel

3. Do you use, evaluate, specify, recommend, purchase: (Circle all that apply)

Operating Systems
(a) Solaris (e) Mac OS
(b) Netware (f) Windows NT
(c) OS/2 (g) Windows
(d) Unix (h) NeXTstep

App. Dev. Products ❑ Yes ❑ No
Networking Products ❑ Yes ❑ No

4. How many people are employed at this location and in your entire organization, including all of its branches, divisions and subsidiaries? (Select only one per column.)

	1. At this location	2. Entire Organization
A. 20,000 +	❑	❑
B. 10,000 – 19,999	❑	❑
C. 5,000 – 9,999	❑	❑
D. 1,000 – 4,999	❑	❑
E. 500 – 999	❑	❑
F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
H. 20 – 49	❑	❑
J. 10 – 19	❑	❑
K. 1 – 9	❑	❑

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23. Dir./Mgr. Sys. Development, Systems Architecture
31. Programming Mgmt., Software Developers
41. Engineering, Scientific, R&D Tech. Mgmt.
69. Sys. Integrators/VARs/Consulting Mgmt.

CORPORATE MANAGEMENT
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12. Vice President, Assistant VP
13. Treasurer, Controller, Financial Officer

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51. Sales & Marketing Mgmt.
70. Medical, Legal, Accounting Mgmt.

OTHER PROFESSIONAL MANAGEMENT
60. Information Centers/Libraries, Educators, Journalists, Students
90. Other Titled Personnel

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E. 500 – 999	❑	❑
F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
H. 20 – 49	❑	❑
J. 10 – 19	❑	❑
K. 1 – 9	❑	❑

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Telecom managers walk cautious line

By Kim Girard

To some corporate network managers, the Telecommunications Deregulation and Reform Act is merely a confusing and vague document that points them in no particular direction.

The pending megamergers borne of the new law have shaken up the telecommunications market. But nearly six months after passage of the sweeping act, users are still unsure about making any moves.

Deregulation

And some say they have no intention of veering from a plan set months before the law was enacted.

"It's early yet," said Bob Domanoski, manager of corporate communications at Ingersoll-Rand in Woodcliff Lake, N.J., which contracts with both Sprint Corp. and AT&T Corp. for T1 and frame-relay service. "We've only planted the seed. It takes nine months to make a baby."

"This is a real challenging period for the corporate planner," said Tom L. Nolle, president of CIMI Corp. in Voorhees, N.J. "There's this huge shadowy figure on the wall called deregulation — the deregulation monster. We can see its ugly image on the wall, but it's all shadow, no substance."

Over the next six to nine months, changes will begin to occur, and users will be following how the Federal Communications Commission moves to regulate and qualify potential carriers in new markets, Nolle said.

After the dust settles, analysts say users should expect more from the merged regional Bell operating companies, including speedier introduction of broadband services in both local and long-distance markets and battles over pricing with interexchange carriers.

And utility companies will be poised to offer telecommunications services, such as voice and data links as well as Internet access.

Deals and proposed mergers launched since the Telecommunications Act passed in February

April 1
SBC Communications moves to acquire Pacific Telesis for $17B

April 21
Bell Atlantic and Nynex agree to a $23B merger

May 1
MFS Communications buys UUnet Technologies for $2B

May 17
MCI Communications and BellSouth agree to link their local telephone networks in five states

Healthy competition

J. M. McGuire, manager of telecommunications and networking at Toshiba America Information Systems, Inc. in Irvine, Calif., said more competition under telecommunications reform is good news.

McGuire said he is unhappy that Pacific Bell has constantly changed the company's account representatives.

"I like being able to leverage our buying power against the local and long-distance carrier," McGuire said. He is currently looking to switch to AT&T for local service.

The ability to provide telecommunications services under the new law will offer plenty of opportunities for utility companies, said John Dubiel, manager of planning at Boston Edison Co.

But Dubiel said he is concerned about the equal access provision of the law, which outlines standards for a new carrier to meet. "People are concerned about this," he said. "Who can attach to your poles? What price can you get?"

Dubiel and Ray Sheedy, director of corporate communications at Walgreen Co. in Deerfield, Ill., said they are careful about their service contracts.

Sheedy said he shies away from long-term agreements and makes sure clauses are included so that the company can withdraw if access problems occur.

For Sheedy, telecommunications mergers mean more players and lower prices for business on services such as frame-relay access. It is only a matter of time before Integrated Services Digital Network access and Asymmetric Digital Subscriber Line flat-rate services to the Internet, which are offered to consumers, are also offered to businesses, he said.

Staying plugged in

Worried about the future of your data network under the Telecommunications Deregulation and Reform Act?

Here are some tips to guide you:

- **Review current contracts and understand how they are tied to existing carrier relationships.**
- **Avoid signing any long-term agreements. Anyone with a large-scale carrier commitment should get an attorney to spell out the company's rights and responsibilities.**
- **Find out from the public utility commission what the alternative providers will be in each area of the country.**
- **Try to assess whether there will be reasons to expect new services in your area. One test: Has your local exchange carrier or regional Bell operating company announced it is filing to get into the long-distance business?**
- **Be aware of what services might change most. For example, local exchange competition will affect high-bandwidth rates of T1 or higher.**
- **Watch for High-Bit-Rate Digital Subscriber Line (HDSL) opportunities. Speeds aren't up to that of a T1 line, which runs at 1.544M bit/sec., but the cost of installing HDSL over copper lines is cheaper and could become more available.**

— Kim Girard

Public groupware networks provide refuge from Web

Services gain steam despite AT&T Network Notes demise

By Tim Ouellette

Online groupware and electronic-mail services are sprouting up everywhere.

IBM's InterConnect for Notes offering on the IBM Global Network is now available, and Fabrik this week will enter beta testing of a public messaging-only service based on Microsoft Corp.'s Exchange Server.

When compared with the World Wide Web, commercial groupware over public networks is more secure.

"To be able to share information with and move data securely to other companies is important," said Ron Miller, president of Chart Links in New Haven, Conn., which develops a Notes medical records application.

Also, the public network means that users need not build their own groupware infrastructure.

For example, IBM's InterConnect for Notes costs a minimum of $2,500 per month and has a $6,000 start-up price tag, but it still costs less than hiring a Notes administrator and maintaining hardware for a Notes network.

Fits the bill

Those services are a good option for medium-size companies that already have outsourced some of their information systems expertise and for Fortune 500 companies with overwhelmed IS staffs, said Scott McCready, an analyst at International Data Corp. in Framingham, Mass.

"A lot of times when a company decides on Notes, for example, they want to be able to roll it out fast to the rest of the organization," he said.

Users are signing up. VHA, Inc., a health-care alliance based in Irving, Texas, is using InterConnect for Notes to help its hospitals, which already use Notes internally, to share clinical information.

The Notes service will allow VHA hospitals to communicate with one another and with outside hospitals, a VHA spokesman confirmed.

A public Notes service is "critical because we are moving information between multiple law firms and corporations," said Paul Zengilowski, president of Data Clearinghouse in Richmond, Vt. Point-to-point connections won't work because of the sheer number of connections needed to hook companies to hundreds of different law firms, he said.

Paul Zengilowski *of Data Clearinghouse favors the streamlined connections that a public Notes service can provide*

Fabrik already provides public CC:Mail, Notes Mail and Microsoft Mail service over its network, with about 350 corporate customers signed up.

Update in fall

For its part, IBM's InterConnect for Notes service will initially be based on Notes 3.x. In September, IBM will offer InterConnect, which is based on a Notes update that combines Notes with a Web server.

And the new offerings keep coming.

US West Communications, Inc. (with Notes) and MCI Communications Corp. (with Exchange) have recently announced public groupware services. Lotus Development Corp. said it has more than 10 firms lined up to provide public Notes networks. WorldCom and CompuServe, Inc. already have existing Notes offerings, with subscriber bases in the thousands.

Although AT&T officially killed its Network Notes service in March because of a lack of subscribers, the firm confirmed in April that it still will work with Lotus to integrate Notes into its Internet offerings.

"Initially, when we looked to do this, AT&T was the only game in town. But IBM has stepped up to the plate very quickly," Zengilowski said.

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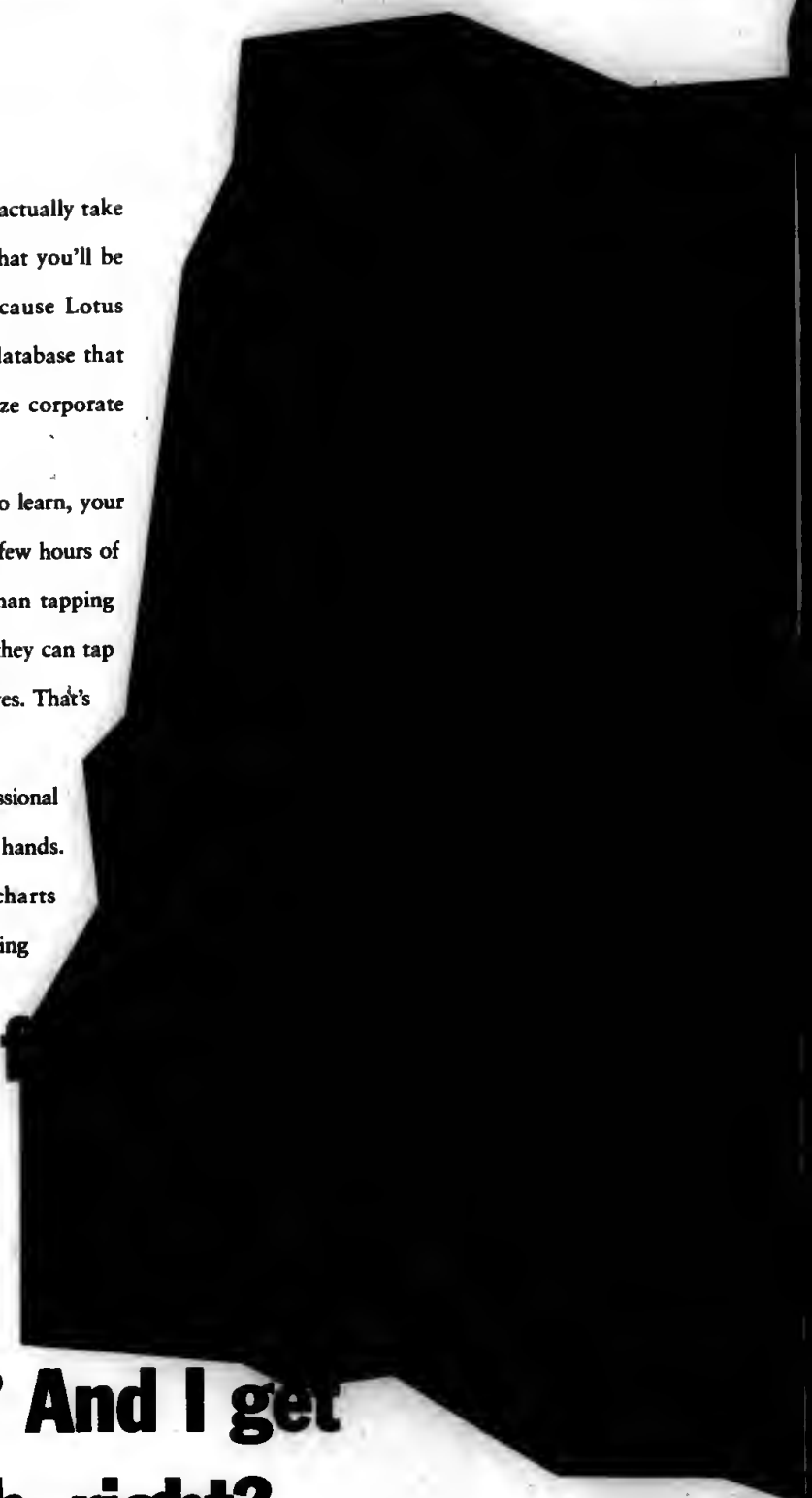

Analyze data f

End

On their own? And I get to go to lunch, right?

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Working Together

Computer Industry

Packard Bell, NEC join forces

Combo will focus on corporate PC market

By Bob Francis

Packard Bell Electronics, Inc. and Japan's NEC Corp. last week combined their PC businesses into an $8 billion operation ready to assault the PC market, especially the corporate arena.

The combined firm, to be called Packard Bell NEC, will continue its push in the consumer market, where Packard Bell has held a large slice of the pie for several years.

But with the acquisition of NEC's U.S. assets and personnel, Packard Bell also gains entree into the corporate market.

The combined operations also will have a strong presence in the government market, via Packard Bell's purchase last year of Zenith Data Systems from Groupe Bull in France.

But even with the deep pockets and technical expertise of NEC, it isn't clear that the corporate market will welcome the Packard Bell nameplate.

The company has a poor reputation among corporate buyers, and its support organization has been geared toward consumers.

"They'd have to have a really compelling story to get in the door at most IS organizations," said Joanne Witt, an information systems manager at an Internet service provider in New Jersey.

"It's a challenge for them — not just the brand, but the various channel conflicts: between NEC, Packard Bell and Zenith," said Richard Zwetchkenbaum, an analyst at International Data Corp., a research firm in Framingham, Mass.

Packard Bell NEC's operations will be based in Westlake Village, Calif., and headed by Beny Alagem, the founder of Packard Bell.

Alagem will retain his titles of chairman, CEO and president.

Transaction action

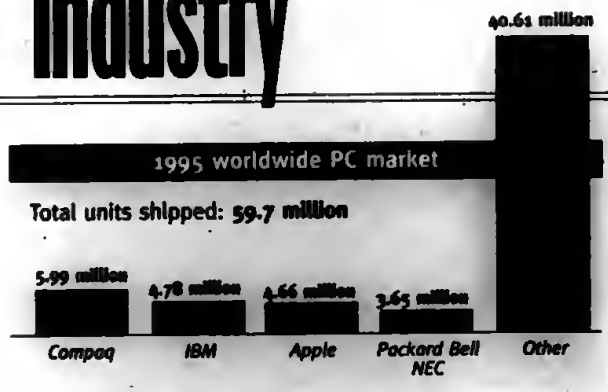
Packard Bell NEC will be the fourth-largest PC manufacturer in the world, after Compaq Computer Corp., IBM Personal Computer Co. and Apple Computer, Inc.

Under the terms of the complex transaction, Packard Bell will receive $300 million in NEC assets, while NEC will get more of Packard Bell's shares, somewhere between 35% and 40%. With an earlier infusion of cash, NEC gained a 20% stake in Packard Bell.

Privately held Packard Bell's 1995 revenue is estimated at slightly more than $4 billion, nearly all of which came from the consumer market.

But the company didn't make money last year, largely because of its purchase of Zenith Data and because it miscalculated which Pentium chips consumers would purchase during the lucrative Christmas buying season.

Multimedia notebooks take a bow. See page 43.



Source: Dataquest, San Jose, Calif.

Apple plan rocks the boat

By Lisa Picarille

Users are already noticing that Apple Computer, Inc.'s latest restructuring is upsetting established relationships with the company.

But they say they are willing to give the reorganizatioo a chance if Apple can turo things around.

Apple two weeks ago announced it would create the following four profit centers: imaging, Macintosh computers, information appliances and alternative platforms.

Cutting across and serving each of those units will be AppleSoft, which will focus on interface and tools design; Advance Technology, which will focus on future products; AppleNet, which will target the Internet; and Reliability and Quality Assurance, which will provide service and support.

One user said the restructuring was a good move for Apple, but destroyed her firm's relationship with the company.

"The reorganization closed the regional office that we dealt with, and our representative is now supporting more users," said Sue Rusiecki, the lead consultant in end-user services at Mount Holyoke College in South Hadley, Mass. The college has 500 Macintoshes and 500 PCs. "We used to have access to a systems engineer that knew a lot about us. Now, we don't have that continuity," Rusiecki said. "There is oo more personal relationship, but we'll deal with it if this restructuring will help Apple in the long run," she said.

Others said they are also willing to be patient. "Look, things couldn't get much worse than they have been over the last year, so if this works, I'm all for it, even though it make things a little hard on us," said an information systems manager at an East Coast investment banking firm. He requested anonymity.

Capps resigns

Just as the new guard laid out its restructuring plan, ooe of the old guard announced his resignation last week.

Steven Capps, who was hired in 1981 by Apple co-founder Steve Jobs, was instrumental in developing the Macintosh's graphical user interface. Capps said he is feeling burned out and wants to pursue software development related to the Internet.

Industry observers said Capps' departure is a blow to Apple because he represented a link to the company's past as a technical innovator and leader. Capps is part of the "brain drain" that has been happening at Apple for more than a year.

But one analyst said the upheaval is just an expected and temporary problem.

Briefs

Internetworking consolidation

Cabletron Systems, Inc. in Rochester, N.H., has acquired Zeinet, Inc., an Asynchronous Transfer Mode adapter card vendor in Santa Clara, Calif. Cabletron paid about $140 million. Adapter card maker Adaptec, Inc. in Milpitas, Calif., acquired Cogent Data Technologies, Inc. in Friday Harbor, Wash., for $68 million.

Outsourcer's apprentice

Affiliated Computer Services, Inc. (ACS) in Dallas expects to be the nation's fourth-largest outsourcer of data processing services. ACS last week announced its impending acquisition of The Genix Group, Inc. in Dearborn, Mich., for $136 million in cash, which will be covered by offering about 4 million shares of ACS stock. The acquisition yields revenue of more than $500 million.

Family ties

John Sculley, former chairman of Apple Computer, Inc., is forming an investment firm with his two brothers. The Blackbern Group will be comprised of David Sculley, senior vice president at H. J. Heinz Co.; Arthur Sculley, former managing director of J. P. Morgan & Co.; and John,

Services spin-off

Platinum Technology, Inc. in Oakbrook Terrace, Ill., has formed a services subsidiary to help information technology groups develop and manage enterprise-scale projects. Los Angeles-based Platinum Solutions, Inc. debuts with a staff of 450, regional and international offices and $80 million in revenue. Platinum formed the subsidiary by combining its education division with several professional services acquisitions. Those include Axis Systems International, Inc., Locus Computing Corp., Paradigm Systems Corp. and Trimic Corp.

COMPUTERWORLD

Visions

MPP

SMP

A Special Report on Massively Parallel Processing and Symmetrical Multiprocessing

CORNELL UNIVERSITY
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MPP & SMP

Worlds Collide

BY CHARLES BABCOCK

Photographer: Jon Feingersh

They may come from opposite ends of the spectrum, but both **Marcy Rosenkrantz**, associate director of supercomputing technologies at Cornell University's Theory Center (at left), and **Sam Laughery**, vice president of production services for the National Association of Securities Dealers, believe the future belongs to hybrid MPP/SMP machines.

MPP/SMP SURVEY

Source: Computerworld/International Data Corp. survey of 80 users. For survey methodology, see page 11, and for more complete survey results, see Computerworld's Web site at http://www.computerworld.com/mpp.

Most Popular Vendors

TOP 5 MPP PLATFORMS

1. IBM
2. NCR Corp.
2. Thinking Machines Corp.*
4. Intel Corp.
5. Cray Research, Inc.**

TOP 5 SMP PLATFORMS

1. Digital Equipment Corp.
2. IBM
3. Cray Research, Inc.**
4. Sun Microsystems, Inc.
5. Sequent Computer Systems, Inc.

*No longer makes hardware. **Being acquired by Silicon Graphics, Inc.

FOR THE past 15 years, the National Association of Securities Dealers (NASD), which operates the Nasdaq Stock Exchange, has been running its financial and human resource applications on a Tandem Computers, Inc. Himalaya K10000 parallel mainframe.

But when NASD wanted to modernize its operation with an application set from PeopleSoft, Inc., it found that PeopleSoft didn't offer a version for the Tandem machine. "One of the difficulties with Tandem is that it doesn't have a lot of off-the-shelf software," says Sam Laughery, vice president of production services for the Rockville, Md.-based association.

NASD's decision: Implement the new applications on a Unix symmetrical multiprocessing (SMP) server, a 10-CPU Symmetry SE70 from Sequent Computer Systems, Inc.

NASD also recently implemented its central registration of 510,000 stock-exchange brokers on another Sequent SE70 machine. Nasdaq, which experienced an 802-million-share trading day earlier this year, has assembled the capacity for a one-billion-share day by the end of the year, although that trading level is not expected until next year. Laughery is confident his existing Sequent cluster can be upgraded to handle the broker authorizations required to support that level.

"SMP was really the only answer for us," echoes Ed Morgan, NASD's director of computer operations at the association's data center in Rockville.

Best of both worlds

Laughery and Morgan are not the only ones reaching this conclusion. Many analysts believe that applications once deemed exclusive to massively parallel processors (MPP) are now finding homes on SMP systems, typically clusters of SMP machines. The reason: After a dozen years of development, the speed and scalability of SMPs has enabled them to muscle in on MPPs' domain.

"The consensus is that MPPs are going away and the market will be taken over by shared memory machines," says Carl Kesselman, computer science instructor at the Beckman Institute at the California Institute of Technology in Pasadena.

MPP **MASSIVELY PARALLEL PROCESSOR:** *A system that uses more than 16 processors in a distributed-memory, scalable, parallel architecture that can scale to more than 64 processors.*

SMP **SYMMETRICAL MULTIPROCESSOR:** *A system that supports a physically shared memory model, has a bus or switch-based architecture and can scale from two to 64 processors.*

COMBO **THERE'S A NEW MODEL:** *Tomorrow's systems will merge the two technologies, creating hybrid systems and having profound consequences for buying decisions of the future.*

That's only part of the story. The time is fast approaching when both shared memory (or SMP) and distributed memory (or MPP) nodes will operate in one hybrid system. Laughery, for one, finds that prospect very appealing. "It means almost unlimited capacity when you put the nodes together," he says.

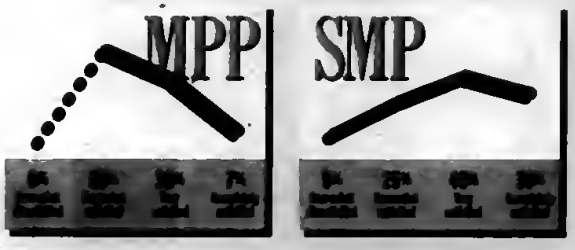
Combining the two technologies is "what the future is going to look like," insists Marcy Rosenkrantz, associate director of supercomputing technologies at the Cornell Theory Center at Cornell University in Ithaca, N.Y.

Researchers at the Cornell Theory Center, which operates the world's largest MPP, a 512-processor IBM SP machine, are investigating practical I/O configurations and other communications issues for these hybrid systems. "I don't think there is any argument that the technologies are coming together," Rosenkrantz says.

Many MPP and SMP vendors agree. Sun Microsystems, Inc.'s SPARCserver, the Exemplar SPP from Hewlett-Packard Co.'s Convex Technology Center, IBM's SP PowerParallel line, Silicon Graphics, Inc.'s Challenge, Sequent's next-generation NUMA-Q design and Pyramid Technology Corp.'s Reliant RM1000 are all grouping sets of CPUs as SMP nodes and arranging nodes in parallel, says Michael

SATISFIED CUSTOMERS?

Ease of use translates into higher satisfaction levels among SMP users.



MPP & SMP

Burwen, analyst at the Palo Alto Management Group, a high-performance computing research firm in Mountain View, Calif. (For details on these and other systems, see page 11.)

And to boost performance, vendors are replacing the passive buses typical in older generation SMPs with intelligent interconnects that move data between processors at higher speeds.

Because the new designs combine multiple CPUs per node, they promise to double, triple or even quadruple the number of CPUs inside the cabinet. For example, Sequent's NUMA-Q machine, due out by the end of the year, will scale up to a maximum of 252 CPUs, with higher CPU counts planned for future generations. (NUMA stands for nonuniform memory access, meaning the different forms of memory — main-, first- and second-level caches — in an SMP machine have been reconciled as a shared pool).

Dana Lam

The challenge for Goodyear's **Anthony Adams** is to make his parts analysis application more "parallelized."

NASD's Laughery plans to make the move to the NUMA-Q machine as soon as possible. "We will be one of the early adopters," he says.

These innovations will help SMP servers address what analysts say was their chief weakness: scalability. It also will help propel the growth of high-performance computing from $2.5 billion in 1994 to an estimated $14.3 billion in 1999, an increase of 41% a year, according to Burwen at the Palo Alto Management Group.

MPP's advantage

While SMPs are gaining ground, MPPs retain an advantage in availability and reliability. Since their processors can be partitioned into segments that back each other up, the machines are not as prone to crash. Tandem, for one, uses a dual parallel architecture to give its K series of MPPs a cherished fault-tolerant label.

On the other hand, when one processor of an SMP machine stops, all the CPUs grind to a halt, says Grègory Pfister, senior technical staff member of the IBM RISC System/6000 Server Group in Austin, Texas.

But no matter what the hardware, to work to its full potential, a parallel machine needs a program to break the task down into parallel parts. That is the challenge faced by Goodyear Tire & Rubber Co.'s Research Center in Akron, Ohio.

Goodyear uses an eight-processor Convex Exemplar SPP (scalable parallel processor) for finite element analysis of rubber parts. The Convex system is the first NUMA machine developed with a high-speed crossbar switch. But during analysis, the Exemplar SPP tops out at four processors, says Anthony Adams, a Goodyear associate scientist.

Goodyear's problem, surmises Steve Wallach, chief technology officer at HP's Convex Technology Center in Richardson, Texas, is that the application is only partially "parallelized." It takes advantage of four processors, but part of the job still runs serially, as if on a single processor. When that part runs, other processors sit idle, he notes.

Intel on the horizon

SMP's simpler, shared-memory designs undercut MPP, but SMP vendors are looking nervously over their shoulders at a new commodity component that is even simpler and cheaper. Intel Corp. is seeding PC-server makers with a four-way Pentium Pro board so they can stamp out low-end parallel servers. The first models are expected in volume late this year.

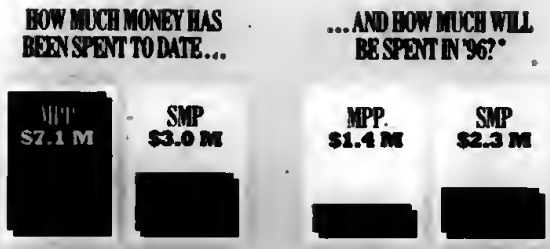
A server based on the Pentium Pro board may retail for $50,000 or less, says the Beckman Institute's Kesselman. Many four-way SMP systems list for three times that, while a comparable four-processor MPP goes for about $300,000. ■

Babcock is Computerworld's technical editor.

SPENDING: SMP LEADS IN '96

Reversing a trend, more is expected to be spent this year on SMP than MPP systems.

**88% of MPP users and 67% of SMP users anticipate adding to their systems this year. The figures reported here are average spending levels.*



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Data WAREHOUSING and Mining

When your warehouse needs more horsepower, you have a choice: Go for either scalability or reliability.

the Big Dig

BY MICHAEL GOLDBERG

THE ABILITY to grow. That was the overriding concern of IS managers at MCI Telecommunications Corp. when they evaluated hardware options for a data warehouse to support their ever-growing log of long-distance calls.

A company dealing with millions of new records every hour, MCI needed a computer system that would expand over time, while still providing the necessary processing capabilities to analyze data, sorting and cataloging up to two years' worth of long-distance telephone calls.

"Because of the consistent growth we've seen, I have to have a machine that will

Continues on page 8

A MATTER OF SCALE

Intermountain Health Care, Inc. in Salt Lake City, which operates hospitals, health insurance plans and health maintenance organizations serving 500,000 people, is working to connect its network of groups to a central data repository. The first phase of the project currently links health clinics to central administrative offices; decision-support applications, however, won't be ready before this summer.

Because it has hundreds of gigabytes of legacy data and expects to collect another 600G bytes in patient, billing and other records annually, the company decided it needed processing scalability. It picked an IBM SP2 (or RS/6000 SP) MPP system as its data warehouse hardware platform. Blake Jensen, assistant vice president for information systems, says Intermountain is confident the SP2 will handle all of its processing needs. Still, he acknowledges that his

mpp

Continues on page 8

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MAKING THE MPP/SMP DECISION

Ken Rudin, managing director at Emergent Corp., a San Mateo, Calif.-based consulting firm and systems integrator specializing in parallel systems, suggests asking six questions before making the MPP/SMP choice:

1. What is the purpose of the application you are setting up?
SMP draws the nod for most mission-critical applications, which usually don't require access to extremely large amounts of data. MPP is the choice for tasks that require complex analytical looks at mounds of historical data.

2. Is the application transaction-oriented or decision-support-oriented?
SMP is a good choice for most on-line transaction processing (OLTP) and small to medium-sized decision-support systems (DSS) for its relative stability. MPP requires extra programming effort to coordinate the processing of separate nodes. MPP is a good selection for large DSS operations because response times to end users can be much faster than with SMP.

3. How much do you expect your data warehouse application to grow over time?
For slow, steady growth – less than 20% per year – SMP is the choice. The scalability of MPP systems can handle data stores that are rising quickly and unpredictably – more than 50% per year.

4. How much I/O scalability do you need?
SMP platforms are easy to run when disk space ranges from 10G bytes to 100G bytes. The scalability of MPP systems means large disk stores – more than 200G bytes – won't create processing bottlenecks.

5. How many end users are you supporting?
SMP systems handle between 200 and 500 users well in OLTP. MPP is the answer for 2,000 users or more, and proprietary systems tend to be more stable than open systems at this level.

6. How much transaction throughput do you require?
SMPs can handle between 2,000 and 5,000 end-user transactions per minute. The scalability of MPP systems means they can handle 10,000 or more transactions per minute, with proprietary systems generally offering more stability.

Continued from page 6

scale to where I think we will be growing," says Bob Mohan, systems architect. MCI's decisioo: Go with a massively parallel processor (MPP) from IBM. "Why would I ever buy a machine that doesn't have the horsepower to do the job?"

Data WAREHOUSING and Mining

The business and IS decision-makers at HealthPartners, Inc., a Bloomington, Minn.-based health maintenance organization (HMO), faced a different set of challenges when they started constructing a data warehouse last year.

Problems arose after mergers left the HMO with a diverse set of information systems that took too long to analyze data, sometimes a day or more for routine reports. Building a data warehouse became a way to create a common data set, which would result in more effective decision-making and faster response times.

For the three-year data warehousing project that began last May, HealthPartoers chose a symmetrical multiprocessing (SMP) server from Digital Equipment Corp. because it offers a very large memory — up to 14G bytes of capacity in the AlphaServer 8400.

Building a data warehouse is a challenging process that can take a lot of people and time, users warn. Time is needed to train staff, and consultants are often required. There are choices to make about a database management system and decision-support tools, and it can be problematic to get end users from different departments to find a common way of looking at company information. And, with all these decisions, come the hardware questions. Picking the right platform is critical to the success of a data warehousing project.

The ability to harvest strategic benefits from the mountains of information a business collects is the promise of data warehousing. And it's the goal of a growing number of corporate IS departments.

The Gartner Group, Inc., a Stamford, Conn.-based market research firm, predicts the market for parallel processing computer systems, driven by client/server applications accessing data warehouses, will reach $5 billion by 1998. That's up from about $1 billion in 1995. And Smaby Group, Inc., a Minneapolis market researcb firm spe-

Continued from page 6

staff has hit some bumps along the way.

Jensen says specialized disks for the SP2 arrived several months later than expected, and the Oracle Corp. parallel database system was about a year late in arriving. IS managers also have needed more time than anticipated to transition to a client/server system. But Intermountain remains committed to the data warehouse project.

"This is a business-critical application for us, and we were willing to put in the time and effort. [But] we went into that a little bit naively, not understanding what would be required, and we have stumbled along the way," Jensen admits. ■

Intermountain's Blake Jensen: "We have stumbled along the way."

cializing in large systems, estimates the demand for very large database and decision-support systems will surpass $2 billion per year by 1999, more than twice what it was in 1995.

At MCI, strategy considerations followed necessity. The Washington-based company is busy, handling approximately 300 million long-distance calls daily. Federal regulators require the company to keep call-detail records, which contain enough information to reconstruct every customer connection, for up to two years. In addition, MCI realized that valuable nuggets of information about dialing behavior were drifting around in the continuous cascade of data.

Mohan says MCI chose a hardware platform suited specifically to the scalability needs his company faces. But the ongoing process of implementing the MPP system has not been headache-free. "The biggest challenge is the effort it takes to develop the software. Buying software or developing software is fraught with peril," he says.

Also, the scalability of MCI's MPP system comes with programming questions that take time and expertise to answer correctly, Mohan adds.

To build its warehouse with the needed scalability, MCI last year chose a massively parallel SP2 system from IBM to replace a series of 14 networked IBM RS/6000 servers. The SP2 system is expected to be in place by July in MCI's Colorado Springs, Colo., data center.

MCI spokesman Ted Jones says long-range goals call for linking the company's call-detail records warehouse to its other decision-support systems, with an eye toward targeting consumers with products that appeal specifically to them.

In HealthPartners' case, the data warehousing goals are similar: improve the efficiency and quality of services.

A key challenge for the HealthPartners IS team is to figure out which pieces of data are most important to answer end users' queries. IS staffers want to set up key summary tables that will answer most analytical questions, pared down from hundreds of gigabytes of raw data, according to Bill Easton, an IS project leader at HealthPartners.

Setting up these tables in the memory of the Digital SMP server will make end users' queries a function of the computer's I/O system and the Oracle Corp. database-management system that HealthPartners is getting, says Bob Landrud, another IS project leader at HealthPartners. The results will be faster processing. When it is done, the IS team expects to provide some reports in minutes that used to take a day or more to generate.

Easton says there are three hurdles to the HMO's efforts thus far. The first, a time-consuming issue, is getting a diverse user community — from internal marketing and medical staff to external customers, such as health care providers and employer groups — to reach a consensus on the types of information they need to deliver improved services.

The second is making sure IS staff and end users understand the kinds of information, such as patient records, that are legally accessible to them. The third challenge involves the realization that a project like a data warehouse takes on a life of its own, and that its focus quickly evolves from a practical mission to a strategic one. "We want to get the data in place as rapidly as possible ... to facilitate some of the analytical activity," Easton says.

The hardware decisions of both MCI and HealthPartners add fuel to an ongoing debate among information systems professionals about the relative benefits of MPP systems and SMP systems. In general, users and analysts agree that MPP systems require more programming know-how and maintenance effort to keep the machine and the applications running smoothly. An SMP system, meanwhile, generally is easier to manage, because it provides a

Continues on page 10

DIGGING FOR DATA

TOP 3 MPP/SMP DATA WAREHOUSING/ DATA MINING APPLICATIONS

1. Customer/marketing/ demographic analysis
2. Financial/securities analysis
3. Manufacturing analysis

Source: Computerworld/IDC survey

It's looking more like an SMP future, Sears' Norman Frees says.

FUTURISTIC SOLUTION

National retailer **Sears, Roebuck and Co.**, a longtime user of MPP systems, is going for an SMP look with a new, strategic data warehouse system.

Sears' existing NCR Corp. computers will remain, but the company intends to standardize some analytical applications around its Informix Software, Inc. database system. It also wants to use a Unix-based SMP server to process queries against a 1T byte data warehouse. Sears has run benchmarks to find the hardware vendor that best suits its needs, says Norman Frees, a technical consultant for strategic infor-

Continues on page 10

Continued from page 9

single image to a computer's operating system and software applications. Users usually don't need to rewrite applications intended for SMP machines.

However, SMP systems do not scale as well as MPP systems do; that is, after a certain point, they do not provide a proportional increase in performance for every processor added to a system.

This is why vendors such as Hewlett-Packard Co., Sun Microsystems, Inc. and Digital offer SMP servers that scale up to 12 processors. Adding more chips to these computers doesn't boost performance much, analysts suggest.

On the other hand, MPP vendors such as IBM, NCR Corp. and Tandem Computers, Inc. offer computers that scale to hundreds or thousands of processors and show improved processing performance.

SMP vendors are working to overcome scalability barriers. Some, including Digital and Pyramid Technology Corp., offer the ability to cluster servers, lashing computers together to make up a larger system for improved scalability or for backup in case one system fails.

Others, such as Sequent Computer Systems, Inc. and Data General Corp., plan, by year's end, to offer systems that simulate the shared-memory access of an SMP system in a parallel scheme with dozens of processors. These companies say they can accomplish this using supercharged silicon and special four-processor boards from Intel Corp. to get the scalability of MPP systems without having to reprogram software applications.

Such innovations tend to blur the distinctions between SMP and MPP systems, while narrowing the appeal of strictly massively parallel systems, observers say.

"The bottom line is that it's a religious war [when you] ask which is better: SMP, clusters of SMP systems or massively parallel machines. Each one is appropriate in different situations," says Ken Rudin, managing director at Emergent Corp., a systems consulting firm in San Mateo, Calif.

The largest implementations of a decision-support system need the processing power and scalability that an MPP system offers, Rudin argues. These are the decision-support systems supporting dozens or hundreds of users who throw queries at a data warehouse containing hundreds of gigabytes or terabytes of data. And though it requires more time and money to install and support an MPP system, the strategic gains can be great, he says.

Other participants in the debate are skeptical of the practical commercial benefits of MPP systems.

Robert Tholemeier, an analyst at Meta Group, Inc., in Stamford, Conn., compares the challenge of maintaining a massively parallel machine to the television performers on "The Ed Sullivan Show" who would keep numerous plates spinning atop long, narrow sticks. Even the best performers broke some dishes.

"[With] the implementation of [MPP systems], you're asking for a management nightmare," Tholemeier says. "The data has to be finely partitioned. You have to be careful, and we expect you'll never get it [perfectly] right."

Combined with the right database and decision-support software, SMP systems offer good performance when used with a data warehouse of hundreds of gigabytes, Tholemeier adds. IS managers who pare down the raw business data to meet end-user needs can help speed up the query process as well. Information technologists "make the mistake of thinking, 'How much data will we need?' instead of [asking] users, 'What problems do [you] have?' " he says. ■

SIMILAR SYSTEMS

THE 3 MOST POPULAR DATABASE PACKAGES IN USE...

MPP	SMP
1. Oracle	1. Oracle
2. Sybase	2. Sybase
3. DB/2	3. CA Ingres

...AND THE TOP 3 OPERATIONS THE SYSTEMS PERFORM

MPP	SMP
1. Simple query	1. Simple query
2. Complex query	2. Complex query
3. Visual data analysis	3. Text retrieval

Source: Computerworld/IDC survey

Goldberg is Computerworld's senior writer for mainframes and high-end storage.

Continued from page 9

mation systems at Sears' Hoffman Estates, Ill., headquarters. A decision is expected late this year.

Although heavy computational jobs still exist for MPP systems, it's looking more like an SMP future, Frees says. "Even if the scalability of SMP isn't there immediately, it will be there," he says.

The goals of the data warehousing project are to use the information to understand customers better, respond to market trends quickly, extend Sears' geographic reach and analyze ways to cut costs. "We're going for a competitive advantage through our use of that kind of information," Frees says. ■

The new SMP system will help Sears analyze consumer data and respond quickly to market trends.

Major players in the field

MPP *systems are collections of central processing units (CPU) — typically 16 or more — in which each CPU has its own memory. To reap the benefits of MPP, applications must be written so that computations are shared among the CPUs, allowing the system to divide and conquer. Although MPPs are often very complex, they do scale well.*

Fujitsu Ltd.	AP1000	http://www.fujitsu.com
Hewlett-Packard Co.*	Exemplar SPP (Convex)	http://www.convex.com
IBM	SP PowerParallel Series	http://www.ibm.com
Intel Corp.	Paragon	http://www.intel.com
NCR Corp.**	1012, 3000, Worldmark	http://www.ncr.com
NCube	NCube-2, NCube-3	http://www.ncube.com
Pyramid Technology Corp.***	Reliant RM1000	http://www.pyramid.com
Silicon Graphics, Inc.****	T3E (Cray)	http://www.sgi.com
Tandem Computers, Inc.	Himalaya K10000, K20000	http://www.tandem.com
Unisys Corp.	OPUS	http://www.unisys.com

SMP *machines are smaller than MPPs — they scale from two to 64 CPUs — and have shared, instead of distributed, memory, which is accessed through a bus or switch-based interconnect. SMPs can be clustered on a network, and some next-generation architectures are evolving that allow both MPPs and SMPs to operate on the same network.*

Digital Equipment Corp.	AlphaServer 8200, 8400	http://www.digital.com
Hewlett-Packard Co.	HP 9000	http://www.hp.com
IBM	RS/6000	http://www.ibm.com
NCR Corp.**	3600, Worldmark 5100S	http://www.ncr.com
Pyramid Technology Corp.***	Nile Series	http://www.pyramid.com
Sequent Computer Systems, Inc.	Symmetry 2000	http://www.sequent.com
Silicon Graphics, Inc.****	Challenge, CS6400 (Cray), Onyx	http://www.sgi.com
Stratus Computer, Inc.	Continuum	http://www.stratus.com
Sun Microsystems, Inc.	SPARCserver	http://www.sun.com
Unisys Corp.	SMP 61000	http://www.unisys.com

* Convex Computer Corp. was acquired by Hewlett-Packard Co. in December 1995.
** Formerly AT&T Global Information Solutions.
*** Cray Research, Inc. is being acquired by Silicon Graphics, Inc.

Source: Computerworld. Note: This is not an exhaustive list.

[illegible]

In January, [illegible] conducted a [illegible] are [illegible] in a [illegible] or [illegible]

[illegible] Computerworld's Web site at [illegible]

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Honoring those who bring great ideas to life

By Julia King

Three decades ago, David Evans co-developed revolutionary techniques for computerized visualization. Today, his computer graphics technology is used for everything from developing artificial organs to designing new airplanes and simulating their performance before they take to the skies.

Last week, in front of a wildly applauding crowd of more than 800 industry leaders, Evans was honored for his lifetime achievements and courage.

Many in attendance were moved to tears during an emotional presentation at the Eighth Annual *Computerworld* Smithsonian Awards in Washington.

Evans, who has Alzheimer's disease, was escorted to the podium and supported by his co-developer, Ivan Sutherland, and his two sons.

Peter Evans accepted the award on behalf of his father, amid a five-minute standing ovation.

Innovators honored

The *Computerworld* Smithsonian Awards honor the creators of information systems that benefit and advance society.

This year, 10 winners made their way to the podium beneath the towering marble pillars of the National Building Museum to accept awards for their varied accomplishments.

The New York City Public School for the Deaf won an award for its CD-ROM-based sign language program.

"For us, information technology has made a formerly invisible world visible," said Susan Abdulezer, whose City Kids Guide to American Sign Language CD-ROM program offers a new and more flexible way to teach and learn language.

Other winners cover a wide range of disciplines (see box, next page), from the state of Texas' computerized immunization tracking system to Farmland Industries, Inc.'s portable global positioning system, which helps farmers in the field collect data to better manage crops.

"Information technology is indeed a universal language which breaks down artificial boundaries and categories and invites us all to understand, and use, great ideas wherever they arise," said Patrick J. McGovern, chairman and CEO of International Data Group, the parent company of *Computerworld*.

1 Washington's National Building Museum, where about 800 guests gathered for the Eighth Annual *Computerworld* Smithsonian Awards last week
2 Graphics pioneer David Evans (second from right) is supported onstage by his longtime colleague Ivan Sutherland (right) and his sons, Peter and David Jr. Peter Evans told the crowd how "the love and admiration" of family and friends is sustaining his father in his battle with Alzheimer's disease.
3 Susan Abdulezer, multimedia coordinator at the New York City Public School for the Deaf, with Gary Beach, president of Computerworld, Inc.
4 Vinton Cerf, the acknowledged "father of the Internet" and co-developer of TCP/IP, received the MCI Leadership Award
5 Award nominees from AlliedSignal Technical Services include (from left) Henry Debnam, Eric Singleton, Paul Hoedeman and Ivan Stern
6 Ann Syptak of the Texas Department of Health celebrates her agency's award for a statewide immunization tracking system
7 Tom Porter, visual effects supervisor at Pixar Animation Studios, accepted an award for the animated film, *Toy Story*
8 Patrick J. McGovern (right), chairman of International Data Group and the Smithsonian Awards Committee, chats with attendees
9 The winners assembled

In the winner's circle

1996 Computerworld Smithsonian Awards

Business and related services: Levi Strauss & Co./Custom Clothing Technology Corp. Newton, Mass.

Education and academia: New York City Public School for the Deaf, New York

Environment, energy and agriculture: Farmland Industries, Inc., Kansas City, Mo.

Finance, insurance and real estate: First National Bank South Africa Ltd., Johannesburg

Government and nonprofit organizations: Mercy Ships, Lindale, Texas

Manufacturing: Parametric Technology Corp., Waltham, Mass.

Media, arts and Pixar Animation Studios and Walt Disney Feature Richmond, Calif.

Medicine: Texas Department of Health -- Immunization vision, Austin, Texas

Science: Center for Light Microscope Imaging and nology, Pittsburgh

Transportation: General OnStar, Troy, Mich.

1996 Smithsonian Information Leadership Awards

The Cray Research Award for Breakthrough Computational Science: Don Stredney and Dr. John McDonald for development of virtual surgery that allows medical students to operate without a human patient

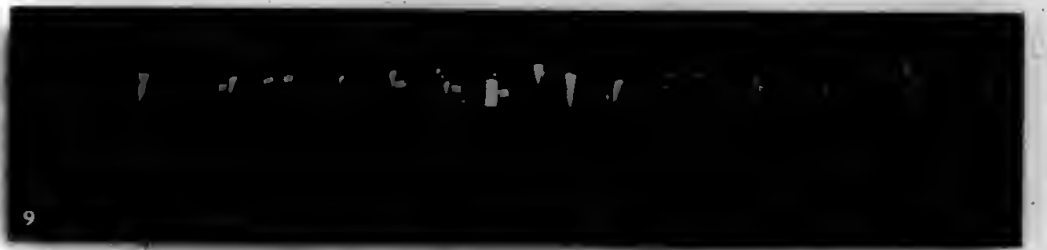
MCI Award for Innovation: Vinton Cerf for his codevelopment of TCP/IP

Price Waterhouse Award for Lifetime Achievement: David Evans and Ivan Sutherland for their work in computer graphics

Science Applications International Corp. Award for Global Integration: Dr. Robert Kahn for his codevelopment of Internet protocols

Zenith Data Systems Award for Education: Gaston Caperton, governor of West Virginia, for his initiative in creating a national model for computer training in elementary schools

PHOTOGRAPHS BY STAN BAROUH



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ATM's flameout

I nearly choked on my muffin recently when I came across a story in *Computerworld* forecasting that the total size of the Asynchronous Transfer Mode (ATM) market in the U.S. this year would be $246 million. That's roughly a rounding error in IBM's annual report.

Could this be the same scalable, high-speed switching technology that inspired predictions such as these just two years ago?

The market for ATM gear will grow from $200 million in 1994 to $1.4 billion in 1997. — Computer Intelligence/Infocorp

Worldwide demand for ATM will grow to $3.1 billion in 1997. — Gartner Group, Inc.

The private ATM network switch market will exceed $1 billion in 1998. — Dataquest

Now compare these forecasts from market researchers today:

"No growth" this year. — International Data Corp.

No widespread adoption of ATM until "1999 at the earliest." — Datapro Information Services Group

What's going on with ATM is a phenomenon that has been played out repeatedly in the technology-crazed IS field. New technology comes online to a flurry of excitement and overblown predictions before users have had a chance to cast their votes.

Well, in the case of ATM, the votes are in, and reality is the winner. ATM is an impressive technology, but it's too much, too soon for most IS organizations. Few users need even ATM's low-end 25M bit/sec. performance, and fewer still can stomach the $30,000 to $150,000 cost for an ATM switch.

In the meantime, frame relay continues to improve with access gear and is available at four-figure prices. Ethernet is scaling nicely to the 100M-bit range, and 1G-bit Ethernet backbones are just around the corner. IS people are buying this stuff because it works, it isn't expensive and it builds on existing investments.

The inflated forecasts for ATM are the product of an industry that easily falls in love with hot technology at the expense of common sense and market realities. Its disappointing market performance is a demonstration of the power that you, the customer, wield when you vote with your pocketbook.

Paul Gillin, *Editor*
Internet: *paul_gillin@cw.com*
www.ultranet.com/~pgillin

A damn tragedy

Actually, it is the sort of letter that you received from Dave Fraatz that has given political correctness a bad name ["Get the soap again," CW, May 27]. He assumes the only usage of the word "damn" is one with a religious context; that is like a homosexual objecting to the word gay being used to describe someone's happiness.

A real tragedy would be if we trashed our working vocabularies in order to remove every word that could possibly, in some context, offend someone, somewhere.

Jim Van Lydegraf
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Inherently faulty

I must take exception to Laura DiDio's article on general protection faults ["Memory leakage the cause of GPFs," CW, May 27], which blames hardware for the deficiencies in Microsoft's operating systems. I have a dual-boot system with DOS/Windows on the first partition of my hard drive and OS/2 Warp Connect on the second partition. Windows has a GPF a couple of times a day, whereas OS/2 has "trapped out" — the OS/2 equivalent of a GPF — only twice in the past seven months. Because both systems reside on the same Pentium, this would seem to be a valid comparison.

I have no doubt that GPFs are exactly that — the failure of a non-pre-emptive operating system to protect the operating system and applications from each other. Memory leak is a related issue that contributes to GPFs but could be controlled by garbage collection and true pre-emption. Windows' design compromises and buggy application programming interfaces make it unsuitable for the tasks, or multitasks, that most corporate users require from a modern operating system. Windows 95 doesn't seem to be much of an improvement, so Microsoft is telling corporate customers to go directly to NT. I'll stick with OS/2.

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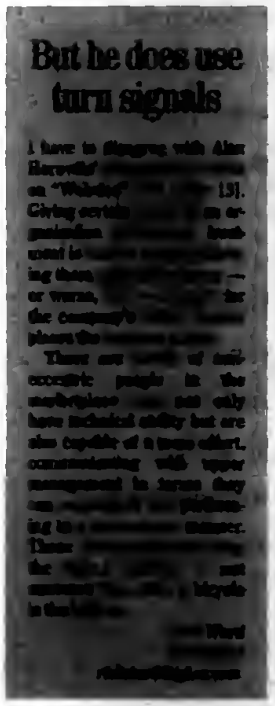

How to stop laptop thieves

The FAA recently learned of a hustle being employed at airports across the country to steal laptops. It involves two people who look for a victim carrying a laptop and approaching a metal detector.

They position themselves in front of the unsuspecting passenger. They stall until the mark puts the laptop on the conveyor belt. The first subject moves through the metal detector, while the second sets it off and begins a slow process of emptying pockets, removing jewelry and so on.

While this is happening, the first subject takes the laptop as soon as it appears on the conveyor belt and moves away quickly.

When traveling with a laptop, try to avoid lines for metal detectors. When you can't do that, delay putting your luggage and laptop on the conveyor belt until you are sure you will be the next person through. As you move through the metal detector, keep your eyes on the conveyor belt, watch for your luggage and laptop to come through and look at what those in front of you pick up.

Capt. Terry Bowman
Chief of technology integration
U.S. Federal Aviation Administration
Washington

● Computerworld welcomes comments from its readers. Letters should not exceed 200 words and should be addressed to Paul Gillin, Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for verification.

White Paper

Special Advertising Supplement

June 10, 1996

IDC

Enterprise-wide Imaging

Doing It Without Mirrors

Part 1 of a 4-part series on Enterprise Storage Management

As Featured in [redacted] and [redacted]

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LAN Magazine, Product of the Year, April, 1995

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Heavyweights Square Off for Enterprise Imaging Crown

Ladies and gentlemen, welcome to "fight night" 1996. Tonight we have the battle for the desktop document imaging heavyweight championship of the world. The purse is reputed by some to be worth more than $1 billion, so it is no surprise to find several contenders. At this time there are three heavyweights in the ring:

- In the red corner we have FileNet Corp. and Watermark Software Inc., weighing in with Watermark Enterprise Edition for any flavor of Windows client.
- In the green corner we have Wang and Microsoft, with imaging for Windows 95 and NT clients.
- In the blue corner: IBM and Lotus Development, with Lotus Notes:Document Imaging (LN:DI).

Why are so many heavyweights contesting this market? The main reason is that the stakes have increased dramatically.

The first generation of imaging, based on proprietary technology, automated a department. Second-generation imaging was dominated by vendors providing turnkey solutions using largely standard components. "Now we are in the third generation," notes Jordan Libit, vice president of marketing for FileNet. "Desktop document imaging is the first opportunity to showcase the business benefits of document imaging across the entire enterprise."

Although a contingent of analysts in the press box are murmuring about the absence of revenue streams, vendors remain steadfast in their belief that the winner's purse will be millions, maybe billions, of dollars.

It could be said that the "promoter" behind all this is Microsoft, whose slipstreaming of image viewing capabilities into Win95 at no cost set the ground rules for the fight. The idea of competing for the title of "Desktop Imaging Champion" on a giveaway basis is a classic Microsoft tactic. Like promoter Don King, Microsoft will get no share of the purse . . . but will get a hefty cut of the action surrounding the event. Its windfall should include significant incremental revenue from increased sales of NT, SQL Server, Back Office and, down the road, Exchange.

Round 1

The fight begins in 1992 when Watermark, in Burlington, Mass., puts on a display of fancy footwork by offering its $99 Discovery Edition, a product that takes traditional production imaging vendors by surprise and captures the hearts — if not the wallets — of imaging fans around the world. Watermark wins this round uncontested.

Watch for the remainder of the 1996 Enterprise Storage Management Series:

RAID	August
Hierarchical Storage Management	October
Client/Server Backup	December

This White Paper was prepared under the direction of Scott McCready, Program Director, Electronic Workplace Technologies, at International Data Corp. and Principal of IDC/Avante Technology, Inc., in Framingham, MA. He specializes in workflow, imaging, groupware and document management technologies as well as measuring the business implications of IT in general. Gerry Murray, Senior Analyst, Electronic Workplace Technologies, for IDC and a senior consultant for IDC/Avante, also contributed to the White Paper. He specializes in imaging and workflow technology. Together, McCready and Murray co-authored *Lotus Notes: Agent of Change*, a study that details the experiences of 65 companies, measuring the costs and benefits of technology investments as well as ROI calculations for each one.

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ILLUSTRATION BY CHRISTOPHER BING

Round 2

As the rest of the industry roils with envy at the company's apparent success, Watermark — in spite of what its competitors think — concludes that Discovery Edition simply is not profitable. So the company repositions itself upstream with its Professional Edition and mothballs the Discovery line (except as an OEM product). Unfortunately, it starts to "trash talk" its old product, which hurts its OEM relationships. Watermark wins this round with minimal contention.

Round 3

Here come the big guns. Wang, the George Foreman of the imaging world, shows it can take a knockout punch and still get back in the ring. And like Foreman, who named all his sons George, Wang implements a similar level of naming redundancy by calling all its software products OPEN/something.

Wang uses a legal judo maneuver to bring Microsoft into its corner, parlaying this advantage into:

- Having Microsoft invest $90 million in Wang
- Becoming the provider of desktop document imaging for Windows 95
- Being designated as Microsoft's preferred imaging supplier
- Being designated as Microsoft's preferred work flow supplier
- Gaining the inside track on Microsoft development efforts

This combination has Watermark reeling, yet Watermark somehow remains on its feet and opts for a "rope-a-dope" strategy while trash-talking Wang's ability to deliver. Wang draws first blood and wins this round unanimously.

Round 4

IBM buys Lotus Development for $3 billion. Now the stakes are sky-high. With Lotus SmartSuite and Notes, IBM finally has a desktop software business. Since Notes comes with a free image viewer, IBM by default enters the desktop document imaging ring.

Not to be outdone by its larger rivals, FileNet buys Watermark — whose annual sales are $6 million — for more than $60 million! The crowd gasps! FileNet becomes an overnight contender but the cost is high. Each heavyweight now has not only desktop document imaging but industrial strength production imaging as well. This round is a draw.

Round 5

In July 1995, Wang acquires Sigma Imaging, arguably the best NT implementation on the market, for $20 million, then scores further for embracing NT as the dominant server platform and potentially the most popular networking system.

Microsoft launches Windows 95. Suddenly the fight has a worldwide audience, as IDC estimates there will be several million image-enabled Win95 desktops by the end of 1997.

FileNet and Watermark counter with a series of jabs, claiming that Wang's desktop capabilities will be too little too late, and that most Win95 users would benefit from upgrading to their Enterprise Edition. Wang absorbs these body blows and commits to building its Win95 imaging viewer before year-end. Wang wins this round.

Round 6

After the action-filled Round 5, all the contestants try to catch their breath before the next onslaught. FileNet and Watermark announce plans to integrate their different viewers, making Watermark desktop imaging compatible with FileNet's production imaging capability. Wang is busy building its Win95 capabilities; IBM is quietly rethinking its strategy with Lotus. By default, the points for this round are shared equally by FileNet and Wang. But IDC would have given Wang the round had it elected to resurrect its image viewer code for Windows 3.X.

Round 7

IBM announces a connection from Notes to IBM ImagePlus via a mail gateway, as well as a second phase of integration that will provide realtime links between the two products, using ImagePlus as the back-end store for Notes. This one-two combination establishes IBM as a premier supplier of distributed imaging. Lotus has a ready-made market for desktop imaging in the form of 15 million+ Notes and cc:Mail users. Add the 70,000+ IBM ImagePlus users, and IBM/Lotus for the first time looks like they have the measure of Microsoft and Wang. Round 7 goes to IBM/Lotus, and they take the lead

Heavyweights vie to be "one-stop shop"

Wang holds the standard **Microsoft** interfacing piece and has a chance to be the de facto desktop imaging standard. Its OLE Automation implementation is based on the same multiple object layering as MS Word and Excel. And since Wang built its image viewer on a component model using OCXs (now called Active X controls), its viewer and toolkit let one use Access, Visual Basic or PowerBuilder to leverage the OCXs in a frame to build one's own custom application.

Wang's pact with Microsoft entailed developing an extension to the TIFF 6.0 file format standards spec for annotating images. The spec was made available to Microsoft developers in April. Says marketing director Tony Grimsditch, "[Wang] knows how to put an image into the Microsoft client environment in the most convenient way for a Microsoft Office user." The next major NT release will contain a version of the image viewer.

Once Wang supports Active X controls, its image viewer will be a pluggable component in the MS Explorer desktop. Wang has run image-enabled work flow over the Internet. OpenImage users can leverage Wang's desktop capability in their enterprise imaging plans. Wang also offers top-notch document management via a pact with PC DOCS. The missing piece — a Notes-like environment to automate white collar functions — is under development, but time-to-market is key; an acquisition may be a better route.

Kodak developed **Lotus Development's** original desktop imaging viewer. Lotus brought imaging development in-house in 1991, an effort culminating in LN:DI 2.6 and the coming Release 4.

Lotus' advantage, says product manager John Caffrey, lies in providing imaging capabilities to a mature, already rich development platform in Notes. Notes has broad platform coverage and unbeatable security down to the field level, so that a user annotating an image can decide at many levels who is allowed to read it, to change it or even to send it to someone else. In leveraging LN:DI's annotation capability, Notes has no competitors. But the LN:DI viewer should not be reviewed in isolation of Notes functionality.

Once **IBM** acquired Lotus, creating a link between ImagePlus (which is available on AS/400, AIX and MVS/ESA platforms) and LN:DI made sense. Notes users could take advantage of the repository capabilities of ImagePlus; ImagePlus customers would have a desktop imaging option.

A mail gateway between the two products was announced in December; integration at the API level is due later this year. Now, IBM customers can link front-office operations such as sales with back-office processes like invoicing. The reason for IBM purchasing Lotus now is clear. With Notes, ImagePlus and LN:DI, only document management is missing in what could be the richest one-stop shop for customers.

Watermark is still selling well even against free products. A $49 option lets its Enterprise Edition client access the repositories of a **FileNet** production system — a boon for firms with investments in FileNet products or whose enterprise imaging vision includes desktop and production imaging.

After acquiring vendors of document management and COLD software, FileNet in April proposed an annotation portability standard with Adobe. Under this specification, annotations associated with an image would remain intact while being converted to the PDF file format. The image and annotations could then be read by Adobe Acrobat.

FileNet has also worked with Novell to develop Ensemble, which allows Novell's Groupwise software to route work between two employees and to be integrated with Microsoft Exchange. All this makes FileNet a one-stop shop for firms automating paper-intensive processes.

Heavyweight Desktop Imaging Weigh-Ins

Stats	IBM/Lotus (LN DI R4)	FileNet/ Watermark	Wang/ Microsoft
Price	($149 est)	$295	Free
IMAGE HANDLING			
Pan, Zoom, Scroll & Rotate	Yes	Yes	Yes
De-skew	No	Yes	No
Grayscale Support	Yes	Yes	Yes
Color	Yes	Yes	Yes
INTEGRATION			
Supports popular file formats	Yes	Yes	Yes
Twain Support	Yes	Yes	Yes
MAPI Mail Enabled	Yes	Yes	Yes
VIM Mail Enabled	Yes	Yes	Yes
Integration with Internet Viewer	No	Yes	Yes
ANNOTATION			
Annotation	Yes	Yes	Yes
Annotation Security	Yes	No	Yes with coding
Highlighter	Yes	Yes	Yes
Sticky Notes	Yes	Yes	Yes
Pop-up Window	Yes	No	No
Drawing Tool	Yes	No	Yes
Standard/Public Annotation Formats	Yes	No	Yes
PROGRAMMABILITY			
OLE Automation using multiple object layers	No (use Notes Flow)	Yes (layers are flat)	Yes
OLE Controls (OCXs)	No	No	Yes
OLE 2.0 Support	Yes	Yes	Yes
Edit in Place	Yes	Yes	Yes
OTHER			
Native 32-bit support	Yes	No	Yes
16-bit app run on 32-bit host	Yes	Yes	Yes
Page Management (add insert, append rescan, delete)	Yes	Yes	Yes
Redaction	Yes	No	Yes
Optical Character Recognition	Yes	Yes	No

Source: IOC/Avante, 1996

on points because they have an economic model for desktop imaging that works! They can afford to give away desktop imaging as long as they sell Notes.

Round 8

Wang opens up and in December, 1995, buys Avail Systems, a Boulder, Colo., vendor of hierarchical storage management (HSM) software, for $32 million in stock. This plan of attack dovetails with Microsoft's future storage management needs for Cairo. More importantly, Wang for the first time has the foundation for fully integrated file management of all data types under the Microsoft/Wang model. The fight begins to go in Wang's favor.

Lotus counters with V4.0 of Notes and Release 4 of LN:DI. Release 4, scheduled for June 1996, looks like it will have significantly enhanced security for annotations. LN:DI is particularly appealing when one considers the platform coverage of Notes and the security features that LN:DI can leverage.

In Round 8, the points are shared equally by Lotus and Wang.

Round 9

The fight shifts to include more than just imaging at the desktop. Imaging is now seen as simply one component of the full desktop automation environment. Most customers begin to recognize that desktop document imaging should be purchased in conjunction with other technologies such as production imaging, work flow software, document management, groupware and Internet browsers. This development dramatically shifts the fight's momentum.

Wang releases its imaging for Windows 95 on time. The feature set exceeds press expectations. Win 95 now includes image display as expected, and Wang has built in scanner controls, fax in/out support and full annotation features. These components are built as OLE 2.0 modules that Wang and Microsoft distribute freely over the Internet.

Wang presents its annotation capability as an open, public format, unlike the private TIFF tags of other vendors. This specification should give customers a higher degree of compatibility between different vendor approaches. Round 9 goes to Wang, but many fight fans think it should have been able to get a standing count against FileNet and IBM.

Now everyone can manage the power of information!

Round 10

Wang has its opponents on the ropes, but fails to land the knockout punch. Although Wang is showing an impressive display of punching power, its opponents continue to move effectively in the ring.

After the exertion of getting imaging for Win95 in the box, Wang seems to be tiring. In spite of delivering a great toolset, Wang has not taken the fight home to the third parties, nor has it delivered an upgrade path to ignite the fans and provide a revenue stream. Nor has Win95 turned out to be the juggernaut that Wang expected.

Wang returns to its corner sputtering about OCXs on its home page, please download. On a brighter note, Wang ships 142 production imaging systems in the quarter ending 12/31/95, with revenues more than double the same quarter in 1994.

Meanwhile, FileNet is bulking up in preparation for a new strategic direction. Having already acquired Watermark to fulfill its desktop imaging requirements, FileNet in January 1996 acquires for an undisclosed sum International Financial Software Ltd., the New York, NY developer of Greenbar Computer Output to Laser Disk (COLD) software and in February buys Saros Corp., a Bellevue, Wash., vendor of document management software for $100 million. FileNet now has a punching combination that Wang and IBM can't presently match. FileNet releases Ensemble, a workgroup level work flow product, and brings Novell into its corner as a distribution partner. This shows that the Wang/Microsoft assault has only made FileNet a more hardened contender. Round 10 goes to FileNet.

Round 11

FileNet plans to issue a joint specification with Adobe for annotations that support the PDF and TIFF file formats. It fails to mention that a public

Desktop Document Imaging

Document imaging — the technology that allows you to scan any business document, then display it as a bit-mapped image on a computer — has been around since the early 1980s. Vendors such as Wang, FileNet and IBM have done good business providing turnkey imaging systems that allow one to process literally millions of pieces of paper. These production imaging systems are installed in thousands of companies and every day more than 1 million workers process document images rather than sift through paper.

Desktop document imaging is suited for scanning the occasional magazine article and keeping a small number of images on individual hard drives. Desktop imaging should also allow one to occasionally access production imaging systems, thereby providing enterprise-wide image access and display capability.

Desktop imaging differs from production imaging primarily by volume. A typical desktop imaging user might scan in a handful of documents at one sitting; a production site can scan thousands of images per hour. As a result, input capabilities, performance issues and storage requirements differ substantially from one system to the next.

IDC believes that for prospective customers to have an effective enterprise-wide imaging strategy, they should purchase desktop document imaging with production imaging in mind and also with how it will fit with future acquisitions such as groupware, document management, work flow and the Internet.

Desktop document imaging will increasingly be a standard component of most PCs. Viewing technology has already been embedded into the operating system and is also available as a free Internet browser plug-in. Personal scanners are being bundled into PCs and keyboards. Thus, a grassroots introduction to the technology will take place in the mainstream market over the next three years.

But users must realize that desktop imaging in not an end in itself. Its true business benefits will be achieved only if it is tightly integrated with an ambitious vision of automation at the desktop. The market is already evolving along these lines and the integration and standardization work underway will ensure that the value proposition for customers will continue its dramatic increase.

annotation specification has been available from Wang and Microsoft for some time. FileNet's specification is preliminary and is not compatible with what is already available from Wang and Microsoft.

Although FileNet announces that it shipped 97 production imaging systems in 1Q 1996 with record revenues of $66.7 million, the firm's nose gets bloodied by Wall Street as it takes a $16 million write-off and a first-quarter loss on "lumpy" performance from Saros and an R&D close-out from International Financial Software. Despite these short-term profitability issues, FileNet looks stronger than ever from its product and market strategy perspectives, and the pressure is on IBM and Wang to respond. IDC believes that both will have to go the acquisition route to compete with FileNet's one-stop shopping approach.

There are still four rounds to go, but if we stopped the fight now the winner would be. . .

The customer. Not only is desktop imaging software literally free, it introduces users to the technical issues and, more importantly, business benefits of ancillary technologies such as production imaging, work flow, groupware and document management. Whether one goes with the toolkit advantages of the Wang-Microsoft approach, the state-of-the-art container design of Lotus, or FileNet's one-stop shopping strategy may ultimately make little difference. Each offers the user an easy point of entry and the ability to leverage an array of technologies.

Post-fight analysis

The early rounds, and many of the slower middle rounds, went to FileNet and Watermark. Watermark had established a significant installed base and a set of reference accounts. FileNet upped the ante by bringing imaging, work flow, document management, COLD software and some form of collaborative computing capability together. In the short term, FileNet took it on the chin with lumpy results from Saros but its overall strategy is compelling.

In the middle rounds, Lotus was bolstered by IBM's purchase, and got more points when IBM added to Lotus' repertoire of moves with ImagePlus. This is a powerful combination for customers automating the enterprise. In addition, IBM can provide imaging at the desktop for free, while making money from Notes and production class ImagePlus installations. This is where IBM is tops: It has an economic model that works for both the vendor and the customer.

In the later rounds, Wang had the opportunity to set the standard for imaging at the desktop. However, the market shifted and although Wang delivered more than it promised, Windows 95 sales were less than expected. This gave the competition some breathing room and also put pressure on Wang to develop a broader market strategy or run the risk that FileNet and IBM/Lotus will do an end run.

Wang is the only vendor with a public specification and an excellent toolkit downloadable from its home page at no cost. Add to this its installed OPEN/image customer set (55,000 seats and growing) and its acquisitions of Avail and Sigma, and Wang has the underpinnings of a very sound enterprise-wide strategy for imaging.

Technological ins and outs

The ability to use a single viewer to display images from several vendors' image repositories is a key part of an enterprise-wide imaging plan. IDC believes that 80% of the companies that have invested in production imaging have a multivendor imaging environment. Those that can benefit most immediately from having enterprise-wide access to their existing image repositories will be the first to face the issue of standards.

All image viewers support the popular TIFF format. But because annotations to the images are contained in a private tag that is unique to each vendor, in most cases a user on a different platform can display the image but not the associated annotations. Furthermore, the security associated with annotations — i.e., who can make changes and who cannot — is lost. So although current technology allows a degree of interoperability, the industry still has far to go to make enterprise-wide imaging a no-brainer.

In all fairness, Wang has made public its annotation capabilities. The result is that even people who do not use the Microsoft engine can still read and write to the files and read and write the annotation data. At AIIM '96 (the Association for Information and Image Management) in Chicago, an exhibitor demonstrated on a Macintosh its ability "to read and

Imaging Raises the Need for Storage

Imaging is a storage vendor's dream. While the typical data packet might hold about 4KB of information, a scanned page or bit-mapped image, even in a compressed format, may average 50KB. Across the board, imaging files are significantly larger than data files.

In companies that have deployed document management solutions, where tens of thousands of pieces of paper are processed every day, the storage requirements are enormous. To provide the performance that these users require, production imaging vendors have created sophisticated storage management software. By migrating bit-mapped images from optical media to magnetic media to the user workstation through caching schemes, this software allows users to retrieve images much faster.

Storage requirements are growing in every corporation, but particularly in those with imaging applications. Desktop imaging environments now require as much storage as those for production imaging. In a production imaging environment, 100 people may each process 10,000 pieces of paper daily. But 500 employees in a company with imaging at the desktop may create nearly the same volume. And when each page is 50KB, even a 1GB disk will fill up pretty fast.

This is why hierarchical storage management, or HSM, for desktop applications is just as vital as a good repository for production imaging environments. (One reason Wang acquired HSM vendor Avail Systems in 1995 was to co-develop storage management software for Cairo.)

Imaging systems are helping firms conserve physical storage space. The average optical drive can hold the paper equivalent of a dozen file cabinets. But storage technology — whether images are being put on magnetic disk, tape, optical devices or paper — is no substitute for proper records management policies. Such policies depend far more upon the industry than a technology; for instance, storage requirements for the mutual funds industry are much more stringent than those for the advertising world.

Many companies keep images on magnetic media, then copy these images to a write-once, read-many (WORM) optical drive to create a permanent archival record that cannot be changed. Of course, permanence is relative. Optical vendors are quoting read lifetimes of up to 50 years. But those same drives may have write lives of only 10 to 15 years. If the drive is not written to in that time period, it never will be.

However, when it comes to storage media, companies need not worry about the risk of technological obsolescence. The storage industry has continually done a great job of having backwards compatibility, and there is no reason to think that will change.

Right now, the hot buzzword in storage and retrieval technology is COLD (Computer Output to Laser Disk). COLD server software writes and indexes mainframe reports onto laser disk. COLD client software lets users search the data stored on disk much faster than with microfiche or by sifting through printouts. Now, instead of running thick mainframe reports that most employees need to see only a small part of, many companies put these reports on laser disk and give their users indexing software. Users can call the report up on a PC and read portions of it.

Some companies use COLD as a low-cost, low-risk entry to imaging. IS shops know how much it costs to print mainframe reports and distribute them, so if they can't get management to buy off on imaging, they may take the intermediate step of implementing COLD, which is easy to sell to management because of its clear cost benefits. Once seen as purely an alternative to microfiche, COLD can now handle documents in a company.

So if you're a betting person, rather than deciding which heavyweight will wear the imaging crown, the sure thing might be to put your money on the storage vendors.

write the Wang/Microsoft annotations and some WIN 3.1 stuff. So clearly it works," notes Alan Hardy, director of imaging product marketing at Wang. "We are willing to work with other vendors to ensure they can take advantage of what we have done, because customers have to be secure in the knowledge that they are getting the complete file."

Prospective customers need to realize that desktop images should be in one file, to provide capabilities such as portability and mailing. However, in a production imaging environment, you need to separate the image document, so that the annotations are stored on magnetic technology [media] while the image data is on optical, for performance and storage management reasons. In some cases, it makes sense from performance and security perspectives to store the pages separately.

Much of the file format and annotation standardization required for broad use of imaging can be best solved by adopting an OLE Store approach.

For desktop imaging to become truly viable as an enterprise-wide technology, IDC believes that:

- Imaging must become as ubiquitous as other desktop applications; and
- The gap between desktop imaging and production imaging must be bridged.

The ubiquity of imaging is rapidly being realized through: 1) Wang's imaging in Win95 shipments; 2) Increasing availability of image viewers as plug-ins to Internet browsers; and 3) The bundling of scanners in PCs and keyboards as standard components.

IDC believes that much of the file format and annotation standardization required for broad use of imaging can be best solved by adopting an OLE Store approach. For example, OLE Store image documents could be included in Office 95+ binders, have their properties exposed in an Exchange inbox, or use Microsoft search tools such as Advanced Find to index and retrieve documents based on metadata such as a customer's account number.

Issue #2 — the gap between desktop and production imaging — can be resolved if production image vendors access images through a standard interface. If OLE Store becomes a de facto standard, the application would not need to know that at some point the image file had been one physical file on the hard drive, or that at another point it had been spread out to different storage locations. In fact, with OLE Store, the application no longer needs to know where the different elements are stored.

One can argue for an alternative approach to an OLE-compatible document format. However, if Microsoft takes the OLE Store concept further by defining a standard annotation model for OLE documents (Excel, Word, Powerpoint and Wang/Microsoft viewer), the entire industry would take a big step up the standardization ladder, making it easier to have desktop imaging as a plug-in technology. .

Advice from "the Greatest"

Muhammad Ali's slogan, "Float like a butterfly, sting like a bee" is good advice for the IS community. Desktop imaging requires much pollination to become pervasive in an organization. But you have to ensure that individual projects are not needlessly repetitious. Applications should have a common look and feel, and security and administrative practices must be consistent across the organization.

IS will have to support a wide assortment of input devices, including scanners built into monitors, keyboards and PCs. IS also will be required to support multifunction devices and hand-held input capabilities, as well as the more common standalone scanning capability (double-sided). If input devices are poorly matched to the job at hand, maintaining them will consume large amounts of IS resources

The technical issues associated with desktop imaging and production imaging differ, but a good enterprise plan takes both into account. IS also has to face three other issues: Does desktop imaging need to be integrated with fax or E-mail to make people more productive? Is it better to use multifunction devices or standalone scanners? How important is color for low-volume scanning?

Ultimately, the productivity impact of imaging on your enterprise will be directly related to answering these questions properly . . . before your users run out and do it on their own. ■

Enterprise-wide Imaging

Doing It Without Mirrors

Sam Albert

Surprise! IBM may crash the Internet party

IBM is finally leveraging its vast resources to become a strong 'net player.

IBM nearly missed the paradigm shift to client/server so you wouldn't expect it to emerge as a strong Internet player. But stranger things have happened. In fact, recent developments indicate that IBM is making a credible run at becoming a seriously wired vendor.

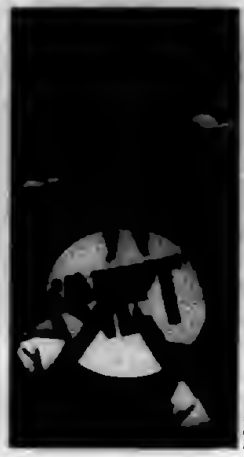
For one thing, the integration of legacy systems with the World Wide Web plays to one of IBM's strengths. American Airlines, for example, is taking existing applications that deliver flight schedules and frequent-flier data and putting that data on the Web for customers. The airline is essentially repackaging the information that resides on its System/390s.

Users are discovering that they can leverage their legacy systems and data rather than create stand-alone Web systems. That's good news for IBM, which likes to point out that close to 70% of the world's business content lives on IBM systems.

Furthermore, with the recent announcement of the company's Net.Commerce System, IBM is leading the charge toward the promised land of transaction-based commerce on the Internet.

After watching IBM shake out the electronic commerce offering by selling tickets for the Atlanta Committee for the Olympic Games, mail-order titan L. L. Bean announced that it will use Net.Commerce System as the backbone for its online shopping service.

IBM's vaunted research operation is also playing a big role in its electronic commerce plans. For instance, the recently announced Cryptolope technology is the result of IBM Research moving to commercialize technology licensed from RSA Data Security. Cryptolope technology secures intellectual content and ensures payment. Big-name companies such as Xerox and America Online are signing up to use Cryptolope to manage copyrighted material on the Web.



IBM Research has other leading-edge technologies in the pipeline, including scalable server technology that can handle more than 1 million hits per hour with no performance degradation. IBM appears to be able to move its research technologies to the market much more rapidly than just a few years ago.

This is definitely a result of CEO Lou Gerstner's demands for short-term results.

Meanwhile, all IBM's middleware has been reworked for the Internet and all its hardware lines have been repositioned as high-availability, high-volume network servers. IBM subsidiary Lotus has announced new versions of everything from Notes to SmartSuite that have built-in Web publishing capabilities. IBM's vertical-industry and consulting units are leveraging technology from the company's research and Internet units to create industry services such as AutoNet. AutoNet allows a prospective car buyer to walk in to a showroom, decide on a car, apply for a loan and get approval in five minutes.

These anecdotes are far from conclusive, and Netscape, Microsoft and AT&T will have big roles to play in electronic commerce, too. But the pattern is emerging: Gerstner's declaration and challenge to all IBM employees to make the company a major player in the world of networked computing seems to be taking hold.

Albert is an industry analyst and president of Sam Albert Associates in Scarsdale, N.Y. His Internet address is samalbert@samalbert.com

Michael Schrage

When is 'good enough' really good enough?

The Microsoft model of software development has infected corporate projects.

Here's the managerial dilemma. All things being equal, which system would you rather develop and maintain?

System No. 1, which crashes unpredictably once every three weeks and takes more than 80 minutes to reboot?

Or, System No. 2, which crashes twice a day and can be recovered each time in less than three minutes? Other than the downtime, both systems perform superbly.

Now let's complicate the question. A straightforward modification of System No. 1 takes almost 30 days to test and implement. A comparable upgrade for System No. 2 takes less than two weeks.

We're not finished yet. The hard-dollar costs associated with maintaining and modifying System No. 1 are barely two-thirds those of System No. 2. Figuring in the soft dollars, however, makes System No. 1 20% more expensive than System No. 2.

By the way, System No. 2 development projects tend to fail badly unless there is active design participation by users. System No. 1 development projects work fine, with far less user involvement.

So, which system would you choose now?

If you're a gutless, spineless wimp, you give the obvious answer: It depends. Are these air-traffic control systems? Automated teller networks? Stock trading systems? Customer reservation networks? Payroll? Logistics? Just how mission-critical are these systems, anyway?

More important than these questions is the new reality that "the Microsoft mentality" was won in the software design marketplace. Ed Yourdon — a software guru whose observations I admire enough to steal — talks about the "good enough" approach that Microsoft has made its dominant design philosophy.

The issue is no longer whether a package or system delivers the best price and performance; the question is whether the software is "good enough" to do the job within the desired parameters.

This Microsoft packaged-software model has successfully infected the broader enterprise application development community. A bug is less a flaw to be fixed than an irritant to be avoided. It is better to quickly deliver buggy software that is easy to maintain and enhance than it is to deliver a well-designed system that works almost flawlessly but takes man-months to modify.

Design for fast flexibility is thus prized over design for initial performance.

Is this a bad trend? Only a gutless, spineless columnist would answer: It depends. I think this was an inevitable trend. For once, trend is destiny. Very few systems are truly mission-critical. Even fewer systems avoid numerous modifications in their first 90 days of deployment.

As long as some core functionality is provided, the idealistic notion that excellent systems are made of software that was designed rather than software that was evolved is as dead as "provably correct" programs in the commercial marketplace.

The real development battles are going to revolve around what constitutes the "core functionality" of a system and what are the true costs of modifiability and downtime. Attempts to optimize will consistently give way to efforts to "satisfice" — which is Nobel laureate Herb Simon's felicitous phrase for, ahem, doing work that's "good enough."

In literature, the cliche is that great stories aren't written, they're rewritten. Similarly, the great software systems aren't designed, they're redesigned. Yes, the core functionality might remain, but nothing so radically transforms a system as interfacing with reality.

That makes modifiability and flexibility the keys to reliability and integrity — not the other way around.

Schrage is a research associate at the MIT Media Lab and author of *No More Teams!* His Internet address is schrage@media.mit.edu.

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UNISYS

The Information Managament Company

Hewlett-Packard introduces its first 64-bit HP 9000 workstations. 44

Servers & PCs

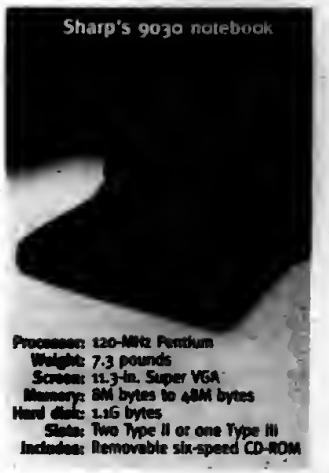
Dell, Sharp move to front in multimedia notebook parade

By Stewart Deck

A quartet of multimedia laptops from Sharp Electronics Corp. and Dell Computer Corp. promises to bring a symphony of sights and sounds to mobile users.

Two new models from Sharp, the PC-9000 and PC-9030, feature built-in, six-speed CD-ROM drives and Sharp's Super High Aperture LCD screens. Dell's Latitude LM P-133ST and LM P-100SD include built-in, four-speed drives and a new graphics chip set designed to process video and graphics quickly.

Notebook users were glad to see Dell finally include a CD-ROM drive in its mobile products. "That's been a weakness in their product line. In our business, that's a very important feature," said Bruce Benham, vice president of information technology at real estate firm Re/Max International, Inc. in Englewood, Colo.


Sharp's 9030 notebook
Processor: 120-MHz Pentium
Weight: 7.3 pounds
Screen: 11.3-in. Super VGA
Memory: 8M bytes to 48M bytes
Hard disk: 1.1G bytes
Slots: Two Type II or one Type III
Includes: Removable six-speed CD-ROM

Hot technology

Benham said Re/Max has used a variety of Dell notebooks. But when the company needed to make multimedia presentations and run a recruiting application on CD-ROM, it looked to Toshiba America Information Systems, Inc. for laptops with onboard multimedia capabilities. Now, Benham said, Re/Max will look closely at the new Dell models as another option.

Dell's new laptops are also noteworthy for their graphics chip set from NeoMagic Corp., said Gerry Purdy, editor in chief of "Mobile Letter," a newsletter in Mountain View, Calif. The chips combine dynamic RAM and complex logic in one chip. "It's a simple but effective chip design that processes video and graphics much faster at lower power," Purdy said.

Sharp's new models feature Super High Aperture LCD screens, a technology that makes screens brighter while reducing power consumption. "This is a pretty hot technology," said Tim Schmidt, managing partner/industry analyst at Encore Consulting Group, Inc. in Altamonte Springs, Fla. "This type of technology will help ex-

Notebooks, page 44

IBM's 64-bit boxes missing from race

By Craig Stedman

After Hewlett-Packard Co.'s introduction last week of its first 64-bit hardware, IBM stands alone: It is the only one of the major Unix vendors without a 64-bit chip.

PowerPC development delays have left IBM at the end of the 64-bit parade. It isn't expected to field an all-new processor until next year, and users and analysts said that leaves IBM's RS/6000 systems vulnerable to being outgassed by more up-to-date machines from rival vendors.

"As much as I'm a big IBM fan, I think they are at a disadvantage right now," said David Pensak, a senior research fellow at Du Pont Co. in Wilmington, Del.

Pensak is in charge of computer science research at Du Pont and primarily uses RS/6000s and Sun Microsystems, Inc.'s SPARC-based systems.

For workstations and servers, the current RS/6000 architecture "is a little long in the tooth," Pensak said. The 32-bit PowerPC and Power2 chips used by IBM "just don't appear to be real competitive right now," although IBM does tend to do a better job of hitting its benchmark numbers in real-world applications than some other vendors do, he said.

IBM's lack of 64-bit technology isn't a big deal in and of itself, observers said. Sixty-four-bit applications aren't close to being widespread, and vendors such as Sun and HP are shipping only hardware for now. They won't have full 64-bit operating systems ready until late next year or even 1998.

But from a raw performance standpoint, IBM's 32-bit CPUs have trouble keeping pace with the newer processors that its competitors have successfully developed and brought to mar-

IBM, page 44

Last out of the gate

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447I	100Hz	100Hz	80Hz			
447W	100Hz	100Hz	100Hz	90Hz	70Hz	
447X	110Hz	110Hz	100Hz	90Hz	78Hz	66Hz
447Xi	150Hz	140Hz	110Hz	100Hz	85Hz	72Hz

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Briefs

Mainframe to PC

For System/390 users looking to offload some applications on to a PC server, IBM plans to upgrade the original version of its mainframe-PS/2 hybrid introduced a year ago. The P/390, also called the PC Server 500 System/390, runs OS/2 and has an embedded board-level System/390 processor.

HP speeds up

Hewlett-Packard Co. introduced higher-performance versions of the low-end D-class servers in its HP 9000 line. The D300 and D360 run up to 60% faster than earlier models because of expanded cache memories that have been added to their PA-7200 processors, HP officials said. Pricing starts at $33,590.

Videophone basics

Intel Corp. wants users to phone home — and to send a picture. Intel in Santa Clara, Calif., plans to ship a version of its Proshare videoconferencing product that uses standard telephone lines. It will use a 133-MHz Pentium PC and a modem that adds video capabilities to a standard phone.

Notebooks

CONTINUED FROM PAGE 43

tend laptop battery power to the 4-hour mark."

Another user wasn't as impressed with the built-in multimedia features. Baxter Healthcare in Deerfield, Ill., is looking for ways to push information out to its mobile sales force, said Steve Locke, a technical specialist at Baxter. He said information on CD-ROM becomes dated as soon as the CD is cut. "We're much more interested in [laptops with] intranet technology features that will let us get up-to-date information out to the people who need it," Locke said.

Dell, Sharp ship advanced multimedia notebooks

Dell's LM P-133ST
- 133-MHz Pentium processor
- 8M bytes of RAM
- 540M-byte hard drive
- 12.1-in. Super VGA active-matrix display
- Four-speed CD-ROM drive
- Price: $3,499

Dell's LM P-100SD
- 100-MHz Pentium processor
- 8M bytes of RAM
- 540M-byte hard drive
- 11.3-in. Super VGA dual-scan screen
- Four-speed CD-ROM drive
- Price: $2,799

Sharp's PC-9000
- 100-MHz Pentium processor
- 1.1G-byte hard disk drive
- Built-in Soundblaster Pro-sound card and stereo speakers
- 540M-byte hard drive
- 11.3-in. Super VGA dual-scan screen
- Six-speed CD-ROM drive
- 7.3 pounds
- Price: $2,999

IBM's 64-bit boxes miss race

CONTINUED FROM PAGE 43

ket. "IBM is finding themselves outmarketed by more nimble design houses," said Rich Partridge, an analyst at D. H. Brown Associates, Inc. in Port Chester, N.Y. "Everyone else has new chips, and IBM is the one that can't figure out how to find its way out of a paper bag."

The 64-bit PowerPC 620 was supposed to be ready late last year, but it had to be redesigned because of poor performance.

On the server side, IBM has been hurt even more by a year-long delay in adding the 32-bit PowerPC 604 to its multiprocessor RS/6000s. Those systems still use the original 601 chip.

Don Johnson, manager of product marketing for enterprise servers and clusters at IBM, said the multiprocessors will finally get the 604 upgrade this summer, which should increase per-CPU performance by 30%.

IBM expects to ship 64-bit servers in the second half of next year. The servers will most likely use the PowerPC AS chip developed by IBM's AS/400 division. "Clearly, we want to have 64-bit technology, but I think you'll see us catch up dramatically" with the addition of the 604, Johnson said.

IBM made small market share gains in workstations and servers last year, according to separate surveys by Dataquest in San Jose, Calif., and Aberdeen Group, Inc. in Boston.

But now that HP and Sun have 64-bit hardware, "the pressure [on IBM] becomes much more real," said Andy Feit, an analyst at Dataquest.

SNAPSHOT

When I'm 64

Hewlett-Packard last week introduced its first 64-bit HP 9000 workstations, including:

Model	Memory	Disk	Monitor	Graphics	Price
C160	32M bytes	2G bytes	17-in. color	2-D	$24,000
C180-XP	32M bytes	2G bytes	17-in. color	3-D	$50,000
K260-EG	128M bytes	2G bytes	20-in. color	2-D	$66,735
K460-EG	128M bytes	2G bytes	20-in. color	2-D	$88,635
K460-XP	128M bytes	2G bytes	20-in. color	3-D	$112,245

Hewlett-Packard Co. joined the 64-bit computing crowd last week by introducing five high-end graphics workstations based on its PA-8000 microprocessor. Prices for the new HP Visualize systems start at close to $25,000, as expected [CW, June 3]. HP has "been a little bit quiet in the technical computing market for awhile," admitted Richard Watts, vice president and general manager of the Palo Alto, Calif., company's computer systems unit. But the PA-8000 puts HP back in the upper echelon of performance on Standard Peformance Evaluation Corp. benchmarks. Volume shipments of the workstations are scheduled to start next month. HP's Unix servers will start getting the 64-bit treatment in September, officials said. — *Craig Stedman*

New Products

Optical Access International has announced CD/Enterprise Server 6400, a 64-drive rack-mount server that provides access to all drives in one cabinet.

According to the Woburn, Mass., company, CD/Enterprise Server 6400 provides more than 42G bytes of data in a single configuration and was designed for enterprisewide environments that require instant access to applications and data on CD-ROMs.

The server systems support DOS, Windows, Windows NT, OS/2 and Macintosh workstations and can directly access the rack-mount servers on networks from Novell, Inc., Microsoft Corp., IBM, Banyan Systems, Inc. and Apple Computer, Inc.

Each server system is configured and managed from a control panel.

Pricing for CD/Enterprise Server 6400 starts at $18,595. More information is available at the company's home page at www.oai.com.

▶ *Optical Access International (617) 937-3910*

Samsung Electronics America, Inc. has rolled out an eight-speed CD-ROM drive, model SCR-830.

Samsung's SCR-830 *CD-ROM drive*

According to the Ridgefield Park, N.J., company, SCR-830 features an Advanced Telephony Application Programming Interface and a plug-and-play, Windows 95- and OS/2-compatible drive. It has cache memory capacity of 128K byte/sec. and is also compatible with single and multisession Photo-CD discs.

The SCR-830 starts at $299.

▶ *Samsung Electronics America (201) 229-4000*

Micro Design International, Inc. has announced CD-Express Connect, an advanced CD-ROM server.

According to the Winter Park, Fla., company, CD-Express Connect acts as a mini CD-ROM server that allows simplified network sharing of CD-ROM data without drawing resources from existing servers.

It can be installed anywhere on an Ethernet LAN, and it automatically configures itself as a Novell, Inc. NetWare or Network File System server.

CD-Express Connect doesn't require dedicated servers, special drives or administrative setup. It is available in a seven-high CD-ROM tower or as an upgrade device for Micro Design CD-ROM drives.

Pricing for CD-Express Connect starts at $995.

▶ *Micro Design International (407) 677-8333*

Digital Equipment Corp. has announced RAID Array 310, a high-performance subsystem.

According to the Maynard, Mass., company, the product has a two-channel fast and wide SCSI controller with 16M bytes of battery backed-up cache and delivers more than 3,000 I/Os per second. A RAID Array 310 pedestal has seven drive bays and can support up to 30G bytes of capacity.

RAID Array 310 is supported on Digital Unix, Sun Microsystems, Inc. Sun Solaris, and Microsoft Corp. Windows NT. Pricing starts at $10,000. More information is available at Digital's home page at www.storage.digital.com.

▶ *Digital Equipment (508) 493-5111*

Product short

Intermec Corp. has announced two handheld laser scanners, the unencoded Sabre 1550 and the encoded Sabre 1551. The two scanners feature an autoadjusting scanning beam, an autotrigger option and broad depth of field for quick scans. Sabre 1550 costs $1,095, and Sabre 1551 costs $1,195. Intermec, Everett, Wash. (206) 348-2600.

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Forrester defines Full Service Intranet as: standardized e-mail, directory, file print, and network management. Netscape gets it. And with SuiteSpot it has begun to deliver on the vision.

–The Forrester Report
The Full Service Intranet, March, 1996

And *PC WEEK* said:

For corporations planning to use intranet-based technologies for internal use, [Netscape] SuiteSpot is shaping up as a better alternative...

–*PC WEEK*, May 13, 1996

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Software

Java-enhanced middleware products make it easier to create business objects, 50

Mainframes build muscle by adding Windows NT to arsenal

Big iron retrofit

By Michael Goldberg

In the past year, IBM's System/390 leaders have held their own kind of glasnost, bringing an openness to the mainframe world through the adoption of Unix operating system traits.

IBM hopes to continue its breakout from the "Big Iron Bastille" with a plan to port Windows application programming interfaces (API) to the OS/390 operating system.

IBM recently announced it is joining with Bristol Technology, Inc. in Ridgefield, Conn., to port Bristol's Wind/U application development software to OS/390. With that technology, programs that use the Win32 API set and are written for Microsoft Corp.'s Windows NT in languages such as C and C++ can be ported to mainframes.

Wind/U recompiles programs designed to run on Windows or Windows NT by linking Win32 APIs to Unix APIs and translating the source code into a binary format that can be executed on Unix servers, said Ken Blackwell, chief technical officer at Bristol. Because the OS/390 supports many Unix APIs, porting a recompiled NT application to the 390 will be comparable to Bristol's ports to a Unix variant such as AIX, he said.

Officials at IBM and Bristol said they hope Wind/U for OS/390 will be made available to software developers by year's end. The first NT applications ported to the mainframe won't be ready until early next year.

It is still undetermined how the Wind/U capabilities will be priced, packaged and sold to System/390 users, IBM officials said.

The move marks IBM's recognition that "Windows is a fact" for many mainframe users, said Charles Lickel, vice president of System/390 software development.

"I need to support the prevalent interfaces like Windows NT and Windows 95. [Not doing that] would be stepping back, in my mind, five years or more to the old mainframe mentality of, 'We know what all the important interfaces are. Here they are. Use them.' That won't work today," Lickel said.

Though some mainframe users will want to use the Wind/U software for in-house projects, observers said they expect the IBM/Bristol deal to initially play to independent software vendors.

One large user encouraging IBM to build mainframe bridges to NT is NatWest Bank in London. It has started using Wind/U to link its NT-based communications and business applications to its System/390 machines without losing any functionality, said Ashleigh Tanner, a technical consultant.

Rich Dill, a member of the research and development team at Powersoft Corp. in Concord, Mass., said the IBM/Bristol efforts mean his firm can port Powersoft's PowerBuilder application development software to the System/390. This will let users build applications on the low-cost hardware platforms that NT supports before testing them on the mainframe, he said.

With the embrace of Unix and this deal with Bristol, IBM has given the OS/390 "a life of its own," said John Young, an analyst at The Clipper Group, Inc. in Wellesley, Mass.

"The System/390 has learned a little better than others that if you don't ride with the latest storm, you get pretty battered. They were three or four years late getting there in Unix. Now they're ahead of the curve [with NT]," he said.

A groggy start for Java products

By Lisa Picarille

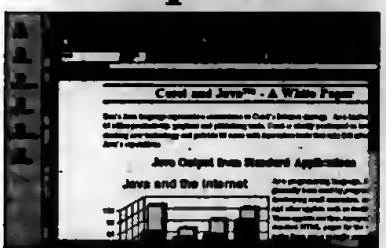
Personal productivity software users still have plenty of time to sort through the hype that surrounds the Java programming language.

Though Java-enhanced versions of these products are apparently on the way, most developers have yet to announce products based on the language.

Part of the delay is due to Java — which allows applications on a network to be accessed from any desktop operating system — being primarily focused on the network, not the desktop.

"Users don't gain anything unless the applications are completely rearchitected," said Jeff Tarter, editor of "Softletter," an industry newsletter in Watertown, Mass. "Java implies a client/server architecture, and almost all of the existing PC applications are designed for the desktop."

The promise of platform-independent applications and reusable code has Internet software developers jumping on Java, but some users of productivity software aren't quite as juiced.



Corel is one of the few *software developers to announce plans for a Java-based suite of applications*

"It's still unclear what benefits Java brings for our

Java products, *page 52*

Links allow easier job scheduling

By Bob Francis

Information systems staffers will be able to coordinate job scheduling across multiple applications — a key feature in managing client/server applications.

That will let companies cut down on the number of job schedulers they must buy and learn. Each application traditionally has come with its own scheduling system, but now vendors are joining forces to ease this problem.

Client/server

For example, Platinum Technology, Inc. in Oakbrook Terrace, Ill., offers its AutoSys job scheduler with adapters that link schedulers built in to SAP AG's R/3 and Oracle Corp.'s Oracle Applications. Platinum Technology is also developing adapters for PeopleSoft, Inc.'s Human Resource Management System and Legato Systems, Inc.'s NetWorker storage management software. And Unison Software, Inc. in Santa Clara, Calif., has delivered SAP links to its Maestro scheduling product that runs on Unix, Windows NT and Hewlett-Packard Co.'s MPE operating systems.

Job scheduling, *page 52*

Application Development

Taking the middle road

HP uses Java to update tool for database access

By Craig Stedman

Trying to jump on the Java bandwagon, Hewlett-Packard Co. is dressing up a little-used middleware product to dynamically fetch files from different databases for Java-enabled users.

HP hopes to rescue its Odapter software from obscurity by giving it Java support and more user-friendly tools. The resulting package, called Depot/J, lets programmers blend business rules and fields from mainframe, Unix and flat-file databases into objects that can be linked to Java applets.

End users who run applications written in Java, Sun Microsystems, Inc.'s Internet programming language, could then view and update the information as if it all came from a single database.

The Depot/J concept sounds intriguing, said Rodger Lindquist, application development manager at Bio-Rad Labs, Inc. in Hercules, Calif. Creating so-called business objects allows workflow processes to be "taken care of in your program rather than the user having to figure them out," he said.

But Lindquist added that HP has to prove that its ease-of-use promises for Depot/J are on the money. "Some of this [business objects] stuff looks real fancy, but what you have to do in the background to set it up can be pretty complex," he said. Bio-Rad, a maker of lab test equipment, uses a mix of HP 9000 Unix servers and HP 3000 minicomputers.

Cyndi Nickel, Depot/J product manager at HP, acknowledged that early Odapter users complained it was hard to work with. For example, the software — which was launched in 1991 as a bridge between Smalltalk or C++ applications — previously required different data fields to be linked manually.

With Depot/J, HP is adding new point-and-click tools that automate the creation of business objects and the blending of objects with Java applets.

"I can see how a developer can end up actually developing applications a lot faster" with Depot/J than with Odapter, said Rui Luis, a project leader at Ericsson Research Canada in Montreal.

Depot/J, like a data warehouse, provides a single location for finding files that come from multiple databases. But it is aimed mainly at applications such as order entry in which end users work with and update live data.

By comparison, warehouses typically store historical information for decision-support purposes. Depot/J, which was introduced late last month, also leaves files in their native databases and stores only the business objects in a repository on its host server.

HP's Depot/J software supports:

Host servers
- HP-UX
- Solaris
- Windows NT (planned for late this year)

Host databases
- Oracle 7.x or higher
- Sybase System 11

Target databases
- IMS
- Mainframe and distributed DB2
- Oracle, Sybase, Informix
- VSAM flat files

Supported Java development environments
- Symantec Cafe
- RogueWave JFactory

Software mapping layers ease object-relational translations

By Frank Hayes

A year ago, object-oriented corporate developers were pretty much on their own. Though objects make it easier to create applications that match real business processes, the widespread dominance of Cobol meant Smalltalk and C++ were decidedly oot the languages of choice in most corporate information systems shops.

Middleware

But the skyrocketing popularity of Java, Sun Microsystems, Inc.'s object-oriented Internet development language, means objects are suddenly hot. And just as suddenly, corporate developers are scrambling to solve problems such as connecting objects to relational data.

"You're really at odda between the two technologies," said Dan Galvin, vice president of engineering at Non-Stop Logistics Corp. in San Francisco, which is developing a nationwide grocery distribution system using Java, C++ and relational databases.

Developers can code those connections by hand, but it takes time and effort.

Instead, developers can use a software layer that automatically makes a relational database look like a collection of business objects from vendors, including Gemstone Systems, Inc. in Beaverton, Ore., Persistence Software, Inc. in San Mateo, Calif., and Business Objects, Inc. in Cupertino, Calif.

Such an object-relational mapping layer translates between the object application code and the queries required to access relational tables, so programmers don't need to worry about relational queries.

- Industry-standard version of Smalltalk
- Support for 50% more users on the same server
- Support for larger (50G-byte) object repositories

But experienced users cautioned that the tools aren't yet ready for more ambitious uses such as complex business rules in the mapping layer.

"It sounds great in theory, but when you get done building the [rules], the business changes so the model is obsolete," said Andre Cassulo, principal systems integrator at Florida Power & Light Co. in Juno Beach, Fla.

Another potential problem is applications designed to give users ad hoc access to data in business objects. "It's a great to give ad hoc data usage to a lot of people," said Kumar Kannankutty, business systems project manager at Medtronics, Inc. in Minneapolis. "But you've got to give them some training first, or they'll have no idea what they're picking from."

Take a closer look at business uses of message-oriented middleware. See page 61.

Go ahead — ask your database anything

By Sharon Gaudin

An information systems manager builds a data warehouse so she can tell her boss how many jeans are sold in each store. But her boss wants more information.

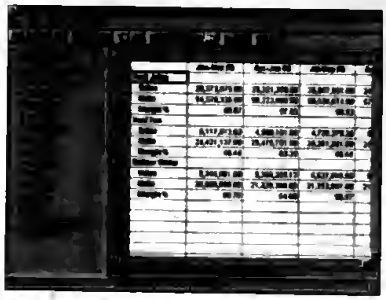
Are size 10 jeans selling better than size 6 jeans? Are black jeans selling better in New York than Miami? Do jeans move faster when T-shirts are on sale?

The next step in querying tools will help that IS manager easily answer those questions — and sell more jeans.

In the past few months, attribute querying has become a reality, with two companies adding it to their arsenal of data warehousing tools. Pilot Software, Inc. introduced it in April with its Pilot Decision Support Suite, and Information Advantage, Inc. included it in the release of its DecisionSuite that ships this month.

Attribute querying "allows us to analyze the information we have" without having to do "a whole lot of work up froot defining things or setting up filters," said Gord Patton, a consultant at Genesis Engineering Systems, Inc. in Toronto.

Patton, who consults for Liberty Health, a supplementary health insurer in Toronto, has been beta testing Information Advantage's DecisionSuite 3.5. He said it has let him query for trends in claims and pricing and for potential fraud. "Normally, you have to set up a filter for, say, male nonsmokers, female nonsmokers, male smokers, etc. ... This allows us to break it down by gender and smoking status on the fly."



Pilot Software's *Pilot Decision Support Suite allows queries on the fly*

Teresa Wingfield, a data warehousing and online analytical processing industries analyst at Giga Information Group in Cambridge, Mass., said attribute querying on the fly — meaning queries don't have to be predefined in the database and schema — has been on many wish lists.

"You're not going to think of everything until you start seeing what [information] you've got," Wingfield said. "You really want to see not just what happened but why it happened."

Attribute querying has been good news for Caroline Castagno, a product manager at IMS America, Inc., a pharmaceutical market research firm in Plymouth Meeting, Pa. She is using the Pilot product to build a workstation for pharmaceutical analysts to find client and product information.

"They need to be able to find out how their products are doing vs. the competitors in the market," she explained.

THE BUILDERS

"WHEN IT WAS TIME TO INTEGRATE 43 DATABASES INTO A WAREHOUSE... IT WAS TIME TO CALL THE BUILDERS."

PJ Matarese, Senior Analyst, Philips Semiconductors

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Your data ought to be in pictures

By Dan Richman

Businesspeople say a picture is worth 10,000 words when analyzing data, and a relatively new category of software is proving their point.

Visualization tools color-code groups or clusters within data, said Jay-Louis Weldon, a senior consultant at SHL, Inc. in Ottawa. They can also graphically display trends and patterns.

Such pictures make big answer sets understandable not only at the end of an analysis, but also during it, which provides clues for the next step in an inquiry.

Often the product of university and commercial research labs, visualization tools are most popular in finance and trading, but other businesses have also started to use them, Weldon said. Vendors that once supported only scientific visualization are entering the business marketplace. At least 10 vendors have put products onto the market — several within the past two years (see chart).

Source: SHL, Inc., Ottawa

NationsBank, Inc., a banking company in Charlotte, N.C., plans to use the Discovery for Windows visualization product from Visible Decisions, Inc. in Toronto. NationsBank will run that product against its multiple databases — some of which are 1T byte in size — to identify likely buyers of future products and profitable buyers of current offerings.

"We may view up to 45 clusters by such things as age, income, family size and location," said Bryan McNeely, a vice president at the bank. "This is a newish technology that we now see as strategic."

Glaxo Wellcome, Inc. uses TempleMVV, from Mihalisin Associates, Inc. in Maple Glen, Pa., to plan marketing campaigns, said Stan Young, a principal consultant at the pharmaceutical firm in Research Triangle Park, N.C.

"When the data is so multidimensional that you'd need 400 graphs to show it, you have two choices: You can use statistical software to pare down the data first, or you can use a multidimensional display tool. Businesspeople prefer the latter."

The tools are a response to the increasingly ambitious analyses sought by users and the ever-increasing size of data warehouses. From those vast reservoirs, conventional query tools elicit textual or tabular responses.

That's fine when the queries are simple. Even the simple graphics in most query tools can display the results of queries such as "Which regions of the U.S. had the highest sales of Product X last quarter?"

But when queries become more complex, specialized tools are needed. The query "Which regions of the U.S. had the highest sales of Products X, Y and Z for the past eight quarters, by sales channel, payment method and salesperson?" simply evokes too much data for many tools to display helpfully.

Java products

CONTINUED FROM PAGE 49

company," said Gary Wilkerson, supervisor of End User Services at Kaiser Permanente Health Plan, Inc. in Atlanta. "There are too many questions about what works with what and how we can maintain our previous investments."

Although a slew of emerging Internet and World Wide Web developers — as well as tool and language companies — have announced a variety of Java-based products, to date only Corel Corp. and Just Systems, a large Japanese software maker, have announced plans for Java-based suites of applications.

At last month's JavaOne conference, Corel demonstrated a Java-based version of its Corel Office suite.

Java 5,000

More than 5,000 commercial and corporate developers last month attended JavaOne, JavaSoft's conference in San Francisco.

But "by the end of the year, we will see a number of beta versions of productivity applications written in Java," said David Spenhoff, director of product marketing at Cupertino, Calif.-based JavaSoft, a division of Sun Microsystems, Inc. Spenhoff declined to provide any details.

Lotus Development Corp. was among those recently announcing support for JavaSoft's new component integration architecture, code-named Java Beans, but Lotus still hasn't fleshed out plans for Java in its desktop applications.

Microsoft Corp. has said it will support Java in its Internet Explorer and in Windows. But in a recent interview with *Computerworld* editors, Chairman Bill Gates wouldn't comment specifically on how Microsoft's best-selling Office suite of applications would support Java.

And one user said not having to worry about that would be a huge relief.

"If everything Java promises is true, then running Java applications over an intranet becomes a boon for us," said one information systems manager at a large East Coast manufacturing firm who requested anonymity. "That should save us a considerable amount of money and hopefully a lot of headaches, provided that the major software developers have Java versions of their products."

Job scheduling made easier

CONTINUED FROM PAGE 49

Client/server applications such as SAP and Oracle come with their own job schedulers, but they only work with their own applications and sometimes don't scale as well as other job schedulers.

"We were looking for one corporate scheduler to use instead of having several for a wide variety of applications and systems," said Mike Mueller, former computing consultant at Wisconsin Electric Co. in Milwaukee. "We wanted to schedule jobs on both our legacy systems and also our new Unix applications, so we began to work on linking AutoSys with our applications," he said.

When Platinum Technology heard about Mueller's work, it sent programmers to work with Wisconsin Electric's IS group on the product.

In Platinum Technology's implementation, which uses the applications' internal job scheduler, AutoSys becomes the central point of control. The AutoSys console runs on Unix and Windows NT and is also integrated with Zeke, Platinum Technology's job scheduler for MVS.

Other job schedulers, including New Dimension Software Co.'s Control, also plan tighter integration with client/server applications, such as SAP and Oracle.

Janet Fowler, an IS consultant at Du Pont Co. in Wilmington, Del., and a user of New Dimension's Integrated Operations Architecture, said a tighter connection with applications is much needed. "We find these systems need as much control as the mainframe system did, so any tools to handle these distributed applications — much like we can with the mainframe applications — will be welcome," she said.

Schedule changes

Platinum Technology is integrating its AutoSys job scheduler with the following client/server applications:

Current
- SAP AG's R/3
- Oracle's Oracle Applications

System management

Future
- PeopleSoft's Human Resource Management System
- Legato's NetWorker

New Products

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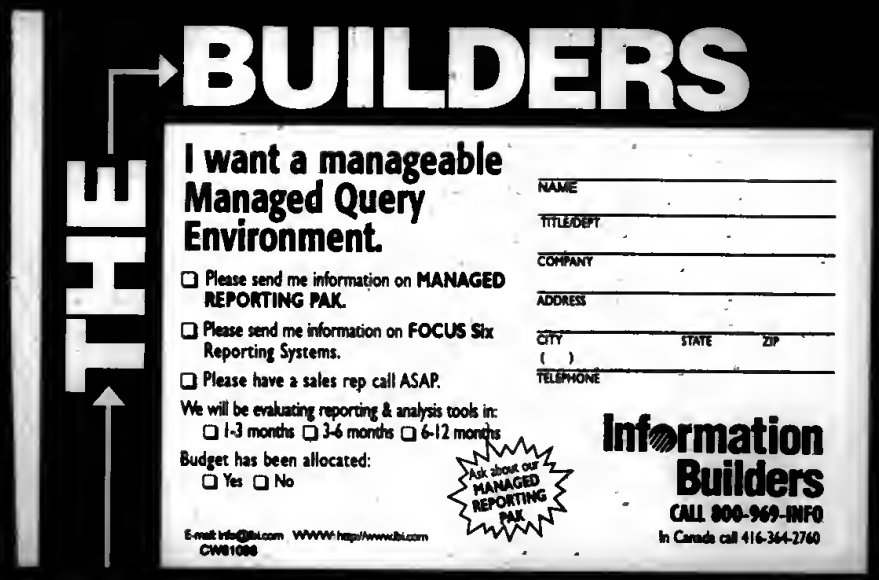
Product short

SourceMate Information Systems, Inc. has released AccountMate Professional/400, an IBM AS/400-based accounting package designed for small to medium-size businesses.

According to the Mill Valley, Calif., company, AccountMate Professional/400 is an automated accounting package that features general ledger, accounts receivable, accounts payable, sales order, purchase order and inventory control modules. The software is customizable.

Pricing for AccountMate Professional/400 starts at $5,995.

Pacific Software Publishing, Inc. has announced KanjiKit for Windows, Japanese language support for Windows. The system lets users browse Japanese Internet sites and send electronic mail with Japanese kanji characters. It uses standard language input software and font sets to display and type characters into English versions of many applications. Cost: $199. Home page: www.pspinc.com. Pacific Software Publishing, Bellevue, Wash. (206) 688-8080.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DECISION.

Louis

Louis

Wireless networks help police take a bite out of crime, 58

The Enterprise Network

Braced for Internet impact

Sprint's pilot program tests firewall, network performance and delivery

By Patrick Dryden

Sapped networks. Clogged gateways. Breached security. Overloaded support structure.

That's what network planners and managers at Sprint Corp. seek to prevent through a pilot project that has provided some 2,000 employees with Internet access for the past year.

Sprint didn't publicize Internet availability so it could control demand and lessen the impact on its existing in-house network and information services.

Eventually, Sprint may have to support nearly 60,000 users — 48,000 Sprint employees and others in subsidiaries and affiliates.

"Wide-open request for service would crush all our support system, so the pilot let us find holes instead of gaping wounds," said Tim Mathias, senior network design engineer at Sprint in Westwood, Kan.

Program expanded

Sprint started small, adding three groups of 50 users to test the firewall and watch the performance of the internal network. But after 60 days, evaluators determined they needed more than 500 users to adequately stress the Internet gateway and the internal network.

Then Sprint expanded the pilot program to test its order and delivery process as well.

Anyone who needed Internet access badly enough and asked often enough received an authorization form, then support.

Sprint's planners and information systems department learned valuable lessons from the pilot program, which is expected to end next month.

New users initially create very high load on the network and gateway as they explore Internet resources.

"We see a spike in usage for two to three weeks, then they settle down to do their jobs," Mathias said.

Sprint

Objective: Enable Internet access for 60,000 users

Fortunately, Sprint can quickly evaluate and adapt its internal network to accommodate such bandwidth demand, Mathias said.

But this usage pattern warns planners to stagger the implementation of service.

Sprint's IS department already has streamlined its service-ordering system in order to assign TCP/IP addresses and install browser and other access software during the Internet rollout.

Upgrades are under way to boost the performance of the gateway platform, and evaluators are configuring the gateway software to balance security, capacity and manageability.

Running the pilot project with a sufficient number of users was essential in determining how many sessions each gateway configuration could support comfortably, Mathias said.

"Translating tests and product reviews to a real environment is difficult because a lot depends on how you implement security," he said.

Lack of control

IS can meet the challenge of ensuring adequate internal bandwidth for Internet users but not reliability.

"The Internet is the only network service that IS doesn't control from end to end," Mathias said.

That's a common complaint, but unlike other corporations, Sprint is blessed with adequate network capacity to start, said Frank Dzubeck, president of Washington-based consultancy Communications Network Architects, Inc.

"This sounds like a client/server rollout, instead of the typical anarchy that results when everyone brings in his own browser," Dzubeck said. "But they better beef up their help desk to provide assistance when the new users wonder what to do."

Token Ring users move to Ethernet

By Bob Wallace

Some longtime Token Ring users are moving to Ethernet switching to save money and boost network performance.

These users are tired of IBM's pricey Token Ring adapter cards and the slow emergence of Token Ring switching. So instead of making the move to "True Blue" Token Ring switching, they are going with tried-and-true Ethernet.

"We were an IBM shop with 300 to 400 Micro Channel PCs but wanted to open up to alternative vendors such as Dell, Gateway and Micron," said Ian Steward, director of information systems at Fish & Richardson, a Boston law firm. "The $100 Ethernet adapters looked much better than $300 to $400 Token Ring adapters."

Steward said he was also looking for a way to support what he thought would be a very popular imaging application that would require more bandwidth than a shared Token Ring network could provide. The firm upgraded to Ethernet switching from 3Com Corp.

Token Ring switching has come along slower than Ethernet switching for a reason. The 10M bit/sec. shared Ethernet LANs run out of capacity before 16M bit/sec. Token Rings. So Ethernet users run out of bandwidth first, and that sparked the rapid emergence of Ethernet switching (see chart, page 56).

Users who make the move go from sharing 16M bit/sec. on a Token Ring LAN with many end users to having a dedicated 10M bit/sec. personal bandwidth pipe to each desktop with Ethernet switches.

Analysts said shared Token Ring LANs are becoming an endangered species.

"Token Ring is on the way out, as [Token Ring]

Token Ring, page 58

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Wireless networks help police take a bite out of crime, 58

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Obstacles encountered after 2,000-user pilot project:

- **BANDWIDTH DEMAND** — must ensure adequate network and gateway capacity

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Welcome to ObjectStar

Police cruising with wireless nets

By Mindy Blodgett

When the police department in Groton, Conn., pioneered the use of a wireless network to communicate with officers in their cruisers in late 1994, analysts predicted that police forces nationwide would swiftly follow suit.

It has taken more than a year, but the Groton experiment with a Cellular Digital Packet Data (CDPD) system did catch on big with police departments, which in the past few months have signed on to CDPD networks in force.

Sgt. Earle Lloyd *of the Mesa, Ariz., police department said the CDPD-enabled IBM ThinkPads save time during investigations*

"It increases an officer's safety and is an invaluable crime-fighting aid by giving instant access to criminal history databases and other information," said Capt. Clifford Balch of the Los Altos, Calif., police department, which is launching one of the two new CDPD systems in that state.

With CDPD systems in place, police can pull over suspects and check registrations without using their radios, which can be easily scanned.

In recent months, Bell Atlantic Nynex Mobile has signed on the police forces in Grotoo, Philadelphia and Bridgewater, N.J., and the Delaware State Police. GTE Mobilenet, Inc. and Software Corporation of America (SCA) have snagged the Gilroy and Los Altos departments, the first two programs in California. Mesa, Ariz., police have used CDPD-enabled IBM ThinkPads for the past eight months.

"It's definitely become a bit of a driver for CDPD," said Nick Zemlacbenko, regional director for data at Bell Atlantic. "For instance, we are installing CDPD in Delaware, where we might not have for a few years, because the state police need statewide coverage. Now the network will be there for other users."

While CDPD carriers wouldn't say exactly how much of the user base is comprised of public safety users, they did say police departments make up a giant chunk of corrent CDPD deployments.

A key attraction to CDPD is its relatively low cost of installation. Private radio oetworks can cost $500,000 or more, according to police. In Gilroy, for instance, the CDPD implementation will cost $223,000. It includes 30 ruggedized laptops, 22 of which will be installed in cruisers, as well as SCA's Premier MDT (mobile data terminal) software, which will allow private messaging between vehicles.

Inexpensive airtime

In a bid to attract the law enforcement market, CDPD carriers are keeping airtime costs relatively low. For instance, Bell Atlantic will charge its police users about $2 to $3 per day per cruiser, Zemlachenko said. CDPD rates normally differ by region, and corporate users can choose from several price plans based oo the oumber of users and the volume of use.

Sgt. Earle Lloyd, a spokesman for the Mesa police department, said the systems are a time-saver during investigations.

"Just this morning, we had a homicide in which the victim was found in a car," Lloyd said when interviewed recently. "The investigators were able to check on the history of the victim and the car immediately, without having to call the dispatcher to do it."

Balch said interest in such a system was fueled in California by the death of 12-year-old Polly Klaas, a young girl who was murdered after her alleged killer — who had an extensive record — was stopped in his car by police, then released.

Token Ring users move to Ethernet

CONTINUED FROM PAGE 55

adapter cards sales are flat," said Trudy Barker, director and principal analyst at Dataquest, a San Jose, Calif., consulting and research firm. "Token Ring switching can turbocharge these networks, but many users are moving to Ethernet switching and Fast Ethernet instead."

That's certainly the case at First Unioo National Bank Corp. in Charlotte, N.C.

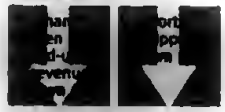
"We've given over 3,000 end users switched Ethernet instead of shared Token Ring already — with 1,500 more due soon," said Fred Cory, assistant vice president and consulting networks systems engineer. Cory and Tod Price, a consulting network systems engineer, calculated they save approximately $400 per seat by going with Ethernet switching over shared Token Ring in new facilities.

Cory, who chose switches from Cisco Systems, Inc., said some PC vendors such as Compaq Computer Corp. ship their PCs with Ethernet adapters.

Mark Kudel took a hard look at upgrading the Token Ring network at R. R. Donnelley & Sons Co.'s corporate headquarters in Chicago and found that moving to Ethernet switching instead would cost $600,000 to $800,000 less.

Tripping the switch

Token Ring users...
(Q1 1996)



...have moved to Ethernet switching
(Switching ports shipped in Q1 1996)

Source: Dataquest, San Jose, Calif.

Easy decision

"It was really a no-brainer for us," said Kudel, R. R. Donnelley's strategic network architect. "We didn't want to risk anything on the not-there-yet technology of Token Ring switching." And like Steward, Kudel liked the idea of going with cheaper Ethernet adapter cards.

R. R. Donnelley needed the bandwidth of Ethernet switching too as the company's use of client/server-based human resources, financial systems, office productivity and data warehousing applications soared and outages occurred.

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New Products

Protec Microsystems, Inc. has aoounced NetAdvantage PSM-Hub.

According to the Montreal company, NetAdvantage PSM-Hub is a 16-port Etheroet hub and five-port multiprotocol print server unit for TCP/IP, Novell, Inc.'s NetWare and Microsoft Corp. Windows 95, Windows NT and Windows for Workgroups. It supports 10Base-2, 10Base-5 and 10Base-T. The product features individual port status and activity displays, a switchable port for cascading hubs and thick and thin Ethernet support.

NetAdvantage PSM-Hub includes automatic features for port link integrity testing, polarity correctioo and port partitioning and reconnection. Pricing starts at $995.

▶ *Protec Microsystems*
(514) 630-5832

Product short

Executive Software International, Inc. has announced Fragmentation Analysis, a free utility that will let systems administrators determine the extent of disk fragmentation on Microsoft Corp. Windows NT systems. The utility can be downloaded from Executive Software's home page at www.execsoft.com. Executive Software International, Glendale, Calif. (818) 547-2050.

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For many companies, MOM knows best

By Tim Ouellette

When you were a child, Mom could always solve your problems.

Many business users think Mom can solve their problems, too.

These users are looking at message-oriented middleware (MOM) as a way to ensure that data flows among disparate applications. This, in turn, can save time and money in getting the right information to the right people.

MOM is a way for applications to send a data message to an application running in a completely different computing environment.

The messages that middleware carries can include a client's request for data from a legacy system, updates to client applications from a database receiving an outside data feed and updates to central databases based on input to business applications at numerous branch offices. The applications adopt client and server roles as needed.

MOM processes all these messages by placing them in queues that can be accessed by the receiving application when ready. In this way, the message delivery isn't tied to whether the receiving system is up and running, and the application sending the message doesn't have to wait for a response.

The middleware replaces the code that would need to be written to make each application speak with one another.

MOM isn't a single parent in the middleware family (see chart above). There are many forms of middleware available, but analysts and users see MOM as more open and reliable than the others.

MOM also is an effective way for users to handle future changes in technology, with minimal infrastructure changes, because the applications involved don't need to be tightly tied together.

That is important to users who want little impact on their current architecture.

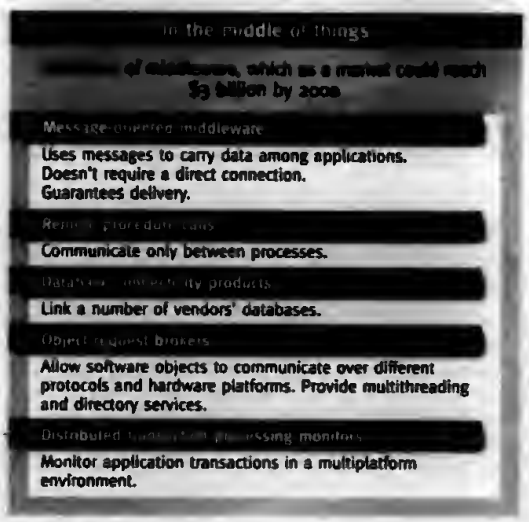
"We didn't want our applications people to code new protocols into their applications," said Ron Berry, a technical risk analyst at Barnett Banks, Inc. in Jacksonville, Fla.

Instead, IBM's MQSeries middleware handles the interaction among applications, with only basic configuration effort required from programmers. In other words, MQSeries became the common interface among the applications.

Now users get the information they need without having to take time to hunt through various company computer systems. For example, since installing MQSeries, users running Notes can automatically receive data from a mainframe system.

And Barnett Banks has seen its loan-processing procedure dwindle from as much as five days of paperwork to a matter of hours, Berry said, because MQSeries automatically messages the relevant information between the client loan applications and the back-end databases.

Programmers at Lane Furniture in Alta Vista, Va., use Software AG's Entire middleware to write references inside their applications to any database the company runs, said Tom Thompson, Lane's manager of information systems. He said the middleware helps keep the master files on the mainframe in sync with the ever-changing files around the company — all in real time.


In the middle of things
of middleware, which as a market could reach $3 billion by 2000
Message-oriented middleware
Uses messages to carry data among applications. Doesn't require a direct connection. Guarantees delivery.
Remote procedure calls
Communicate only between processes.
Database connectivity products
Link a number of vendors' databases.
Object request brokers
Allow software objects to communicate over different protocols and hardware platforms. Provide multithreading and directory services.
Distributed transaction processing monitors
Monitor application transactions in a multiplatform environment.

Source: Ovum Ltd., UK

Streamlined access

Users can also access a mix of computer-aided design files on a Unix system, PC files and mainframe files without having to move to each system.

"Without [middleware], we would have to do batch files to transfer data back and forth," Thompson said.

Other users say messaging provides more guarantees that the data will get to the right place, regardless of whether the receiving server goes down. Blue Cross/Blue Shield of Oregon turned to MOM from PeerLogic, Inc. because Kip Stevenson, manager of systems development, said the technology was more reliable than other choices.

The company checked into object request brokers and remote procedure calls in addition to MOM. "We felt messaging was a little more mature," he said.

The MOM market got its jumpstart in financial institutions such as Barnett.

Just a few years ago, many firms were tired of maintaining their homebrewed middleware systems, and companies such as IBM, Momentum Software Corp., Digital Equipment Corp. and PeerLogic stepped in to fill the breach with stable products and support.

Each product has a different way to assure message delivery, and each varies in the amount of extra programming needed for applications to speak with one another.

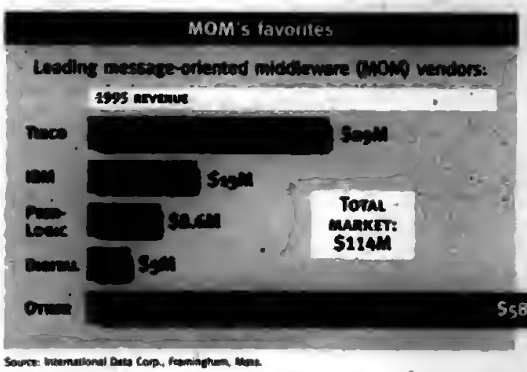
Momentum's X-IPC middleware is used by Andersen Consulting as the basis of the Chicago consulting firm's Dante middleware architecture. Popular among financial institutions, Dante distributes nontraditional data types across multiple platforms, something traditional transaction processing monitors can't do.

Other industries that are heavily into MOM include insurance, health care and travel and tourism, where users need to grab information from multiple sources to prepare reservations for travelers.

Time-saver

AAA Auto Club South, Inc. uses MQSeries to cut the time of doing credit-card authorizations over the telephone. The club plans to use MQSeries to help route requests for AAA's Triptiks — personalized trip maps for AAA members — to the correct service provider.

Ovum Ltd., a consulting firm in the U.K., expects MOM sales to make up 23% of the overall middleware market by 2000. Traditional market-leading database middleware tools are expected to drop from a 73% share in 1994 to 19% in 2000.



Source: International Data Corp., Framingham, Mass.

The future is in the middle

MOM is starting to catch hold among users, but observers say vendors must first help would-be customers figure out what MOM is and why it would help them.

"The No. 1 problem for messaging middleware is identity crisis," said Ed Acly, an analyst at International Data Corp. in Framingham, Mass. Although other middleware segments are well-defined, "there is nothing like that for the MOM guys to rally around," he said, because MOM is still one of the new kids on the middleware block.

Two areas that could help the growth of MOM are groupware and the Internet.

Groupware offers collaborative features that middleware can enhance by pulling data into a group of applications or disconnected database from outside sources. IBM has been working to capitalize on this by linking its MQSeries MOM to Notes.

Observers think the World Wide Web will help MOM by simply being an example of a universal networking infrastructure. MOM vendors could refer to the Web and show users that MOM could provide a similar universal networking infrastructure for their companies. It wouldn't matter which protocols or platforms companies are running; the data could still be carried among applications.

Will any one vendor dominate the market? Many small players have made themselves a niche (see chart at left).

But at least one analyst expects a certain group to rise to the top.

"The hardware vendors will have an advantage here because of their previous knowledge of mission-critical systems," said Susan Eustis, vice president of Wintergreen Research, Inc. in Lexington, Mass.

When you try to capture mainframe or server data from a desktop application, you really need a heavy-duty, mission-critical product, she said.

— Tim Ouellette

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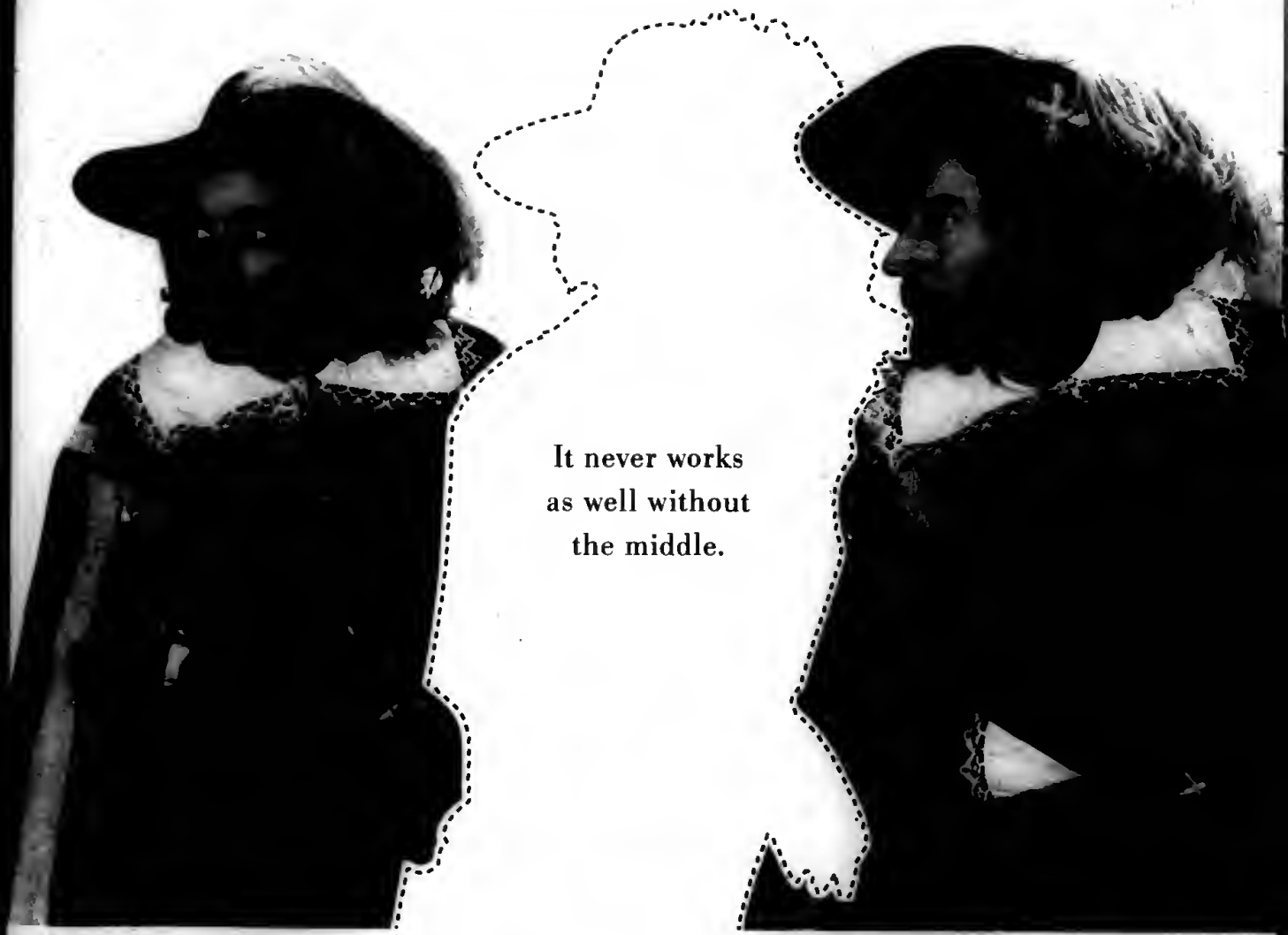

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Market for intranet security tools nearly doubles, 66

The Internet

Development tools head for the Web

VBNet runs client/server apps over 'net

By Mitch Wagner

TVObjects Corp. in Princeton, N.J., has introduced a software development tool that provides a graphical front end for generating Visual Basic applications that run on the World Wide Web.

The software can also be used to convert Visual Basic applications to run on the Internet.

The VBNet software, an add-on to Microsoft Corp.'s Visual Basic 4.0, lets Visual Basic programmers write Internet-enabled client/server applications faster, without requiring that users learn nitty-gritty details about 'net protocols and application interfaces.

"What's missing on the Web is a point-and-click development environment," said Mark Istvan, a webmaster at the U.S. Coast Guard Operations Systems Center in Martinsburg, W. Va. "You can spend a lot of time on [HyperText Markup Language] coding, just designing how you want your user interface to look. VBNet gets around that. It allows me to concentrate on what I want to do and when I want to do it."

Application development

Istvan is using VBNet to build a personnel application to track 39,000 volunteer officers for the Coast Guard. He said VBNet will let him construct an application that will run as a straightforward client/server Visual Basic application and as an Intranet application.

VBNet gives users access to data stored in corporate databases via the Open Database Connectivity interface, which most database vendors support.

Systems requirements

VBNet requires that users run their Web servers on Microsoft's Internet Information Server. A version that runs with the more popular Netscape Communications Corp. server is planned within months, said Andy Goren, president of TVObjects.

On the desktop side, the software is compatible with most systems. It runs with Microsoft's Explorer or Netscape's Navigator; those two Web browsers hold more than 75% of the market.

The VBNet software, available now, costs $197.

Borland's Delphi made Web-compatible

By Frank Hayes

Delphi is heading for the 'net.

Borland International, Inc. later this month will ship an upgraded version of its Delphi visual development system designed to help build Internet applications and World Wide Web sites.

The $799 release — an updated version of Delphi Developer 2.0 — includes Delphi components that support electronic mail, file transfers and Internet newsgroups, according to the Scotts Valley, Calif., company.

The update also supports Microsoft Corp.'s Internet Information Server and includes DeltaPoint QuickSite, a Web-server management tool.

Delphi's enterprise version, which costs $1,999, will also add improved database connectivity and better integration with third-party analysis, design and testing tools.

One user said it will be nice for Delphi users to be able to build Internet sites without having to learn another development tool.

"We've already outsourced some Internet development because we're backlogged with all our own efforts right now," said Chris Marcus, client/server development manager at Sara Lee Knit Products Corp. in Winston-Salem, N.C., where Delphi is the standard development tool. "But it's extremely cost-effective — if we don't have to learn another tool — to do Internet development ourselves."

FRUIT OF THE LOOM.

A peachy site

Clothier automates communication

By Mitch Wagner

Fruit of the Loom, Inc. doesn't want to let electronic commerce catch the company with its shorts down.

The $2.4 billion Chicago maker of underwear, T-shirts and casual apparel plans this month to launch Activewear Online, a business-to-business World Wide Web site to let other businesses order T-shirts and sweatshirts for custom decoration.

Fruit of the Loom *plans to launch Activewear Online, a business-to-business Web site to let other businesses order T-shirts and sweatshirts for custom decoration*

"A decorator might make 12,000 Grateful Dead T-shirts out of our product," said Charles Kirk, senior vice president and chief information officer at Fruit of the Loom. About one-third of the company's sales come from those products, called the Activewear line.

Activewear Online is Fruit of the Loom's attempt to automate critical business communication with the wholesalers who supply Activewear products to the smaller shops that decorate and resell them.

It is a Web server with a twist: The server is a combined Web and transaction server linked with an Oracle Corp. database to store product information. The software runs on a Sun Microsystems, Inc. SPARCserver at Connect, Inc. in

Fruit of the Loom, *page 66*

Hackers step up attacks

New assaults include Linux break-ins, mail bombs

By Gary H. Anthes

Old favorites, such as password sniffing, appeared on the latest summary of most popular computer attacks reported recently by the Computer Emergency Response Team (CERT). But some never items appeared as well: a rash of assaults on Linux machines and an epidemic of mail bombs and spam attacks.

In a recent alert, the CERT, which operates out of the Software Engineering Institute at Carnegie Mellon University in Pittsburgh, said it is seeing frequent attacks of the following types:

- **Password cracking.** An intruder steals a password file, decrypts the passwords and uses them to gain access to files, applications and systems.
- **Linux attacks.** These include the surreptitious installation of "password sniffers" on machines running Linux. They grab users' passwords as they travel over a network.
- **Attack scans.** Widely available diagnostic tools such as the Internet Security Scanner and Security Analysis Tool for Auditing Networks are being used to automate hackers' probes for system vulnerabilities.
- **Mail spoofing, mail bombing and spamming.** Described by the CERT as "denial of service attacks," these techniques are used to fill up someone's disk or flood a network or host.

Linux machines are

Computer attacks, *page 66*

Market for intranet security products nearly doubles

By Kristi Essick

Network break-ins still top the list of fears for most network administrators and private users of the Internet, according to attendees of Northern Telecom Ltd.'s Network-Wide Security seminar.

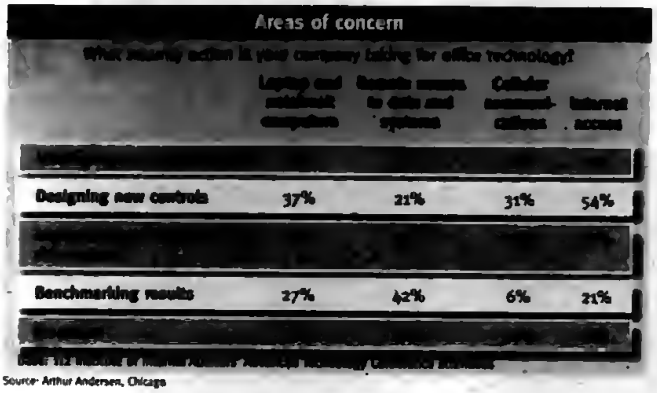
Network security

Because of those concerns, and because of the speed at which firms are deploying intranets, the market for products such as encryption tools and secure servers aimed at intranet development has more than doubled in the past six months, said Rick Spence, an analyst at market researcher Dataquest in San Jose, Calif.

Companies and users are still reluctant to put mission-critical or personal data such as medical records and credit-card information on a network where there is the slightest security risk, he said.

Another conference attendee said he wouldn't completely trust any encryption product available today. "It's a continual horse race between the security companies and the hackers. I don't see the race being won by either side any time soon," said Scott Figgins, a programmer/analyst at Sterling Software, Inc.

Figgins is working with NASA to develop intranets secured by Nortel, Inc.'s public-key encryption product, Entrust.



Source: Arthur Andersen, Chicago

Favorable response

Entrust did get a vote of confidence from attendees at the Nortel conference, which focused on how companies such as electronic-mail vendor Qualcomm, Inc. and electronic forms vendor Shana Corp. are working with Nortel to get their applications to work with Entrust.

"Entrust is becoming the de facto standard," said Dan Phan, a software design engineer at Hewlett-Packard Co. who is helping financial institutions set up networks secured by the Entrust system. "It's trustworthy enough for the banks I work with, and the public and private key management is much easier than it is with Pretty Good Privacy," a freeware public key encryption program.

Entrust, certified by the National Institute of Standards and Technology, is based on X.509 public key certificate technology. It allows users to send and receive encrypted data over networks and the Internet, according to Ian Curry, Entrust product manager. Related Nortel products also include a secure server, an X.500 directory and a hardware-based security add-on.

Analysts, users and security product managers agree that network security is a field in which firms can be made or broken with the introduction of a stellar product.

Essick writes for the IDG News Service in San Mateo, Calif.

Fruit of the Loom

CONTINUED FROM PAGE 65

Mountain View, Calif. Connect also wrote the software.

The twist on the Web server is that wholesalers can customize the front end of the site, store their inventory data in the database and access the server through their own uniform resource locator.

The result is that each wholesaler that subscribes to Activewear Online will appear to have its own Web site, from which customers can order apparel. Orders are then faxed from Connect to the wholesaler, which fills the order from its own stock.

Fruit of the Loom plans to open the server to about 50 of its biggest wholesalers this summer. First up: Broder Bros. Co. in Plymouth, Mich.

"We jumped right on it," said Todd Turkin, executive vice president of Broder Bros. "We're confident that the Internet will increase in importance—both in terms of orders coming in and in terms of the number of services we can offer on the 'net." In the future, Broder Bros. hopes to let its customers scan through its inventory online, see invoices and participate in real-time chat with experts in decorating.

Fruit of the Loom won't charge wholesalers for a place on the Web server.

The firm plans to make its money on the increased volume of apparel sales, which officials said will be attributable to the comparative ease of online transactions vs. the current way of doing things. Decorator shops now telephone in orders to distributors, a time-consuming process that usually must take place during business hours.

Fruit of the Loom started planning the site in early winter. The company information systems department oversaw the technical implementation, working with internal marketing staff. But much of the work was outsourced, Kirk said.

Computer attacks

CONTINUED FROM PAGE 65

being used more often because local Internet access providers like the freely available Unix operating system, said Kathy Fithen, CERT's team leader for strategic incident response. On the down side, Linux is especially vulnerable because it exists in several variants. This, in turn, provides hackers with an opportunity because the variants make it harder to keep up with security holes and patches, she said.

Fithen said hackers are far more effective now than even a year ago because of the availability of automated hacking tools. "The sophisticated intruders are making the tools available to the community so novices can use them to break in to systems," she said.

These tools include software that will automatically capture and decrypt passwords, dial modems and attempt to log in and probe systems for security holes.

Peter Tippett, president of the National Computer Security Association in Carlisle, Pa., said experts have for years predicted "IP spoofing," in which a hacker masquerades as a trusted host by predicting message sequence numbers. Once the notorious hacker Kevin Mitnick perfected the ploy, several automated IP spoofing tools were written, Tippett said.

To protect against password compromises, the CERT recommends using a "shadow" password file that moves passwords to a more protected file.

It also recommends using one-time passwords that can't be reused by a hacker who happens to intercept one on the network. The CERT's advice about computer security risks and protection is available on the Internet at ftp://info.cert.org/pub/.

William J. Orvis, member of the Computer Incident Advisory Capability (CIAC) team at Lawrence Livermore National Laboratory, said the most common attacks are simple probes such as a request for a password file using Trivial File Transfer Protocol. The CIAC is a facility similar to the CERT that is run by the U.S. Department of Energy laboratory in Livermore, Calif.

Tippett said a disturbing recent development not included in the CERT alert is break-ins to Internet access providers' systems. There have been three in the past month, he said.

He said a hacker who gains control of an access provider's host then has carte blanche on the customer World Wide Web sites maintained by the provider and to electronic mail flowing through the host.

Nothing is more uncomfortable than discovering your server is too small.

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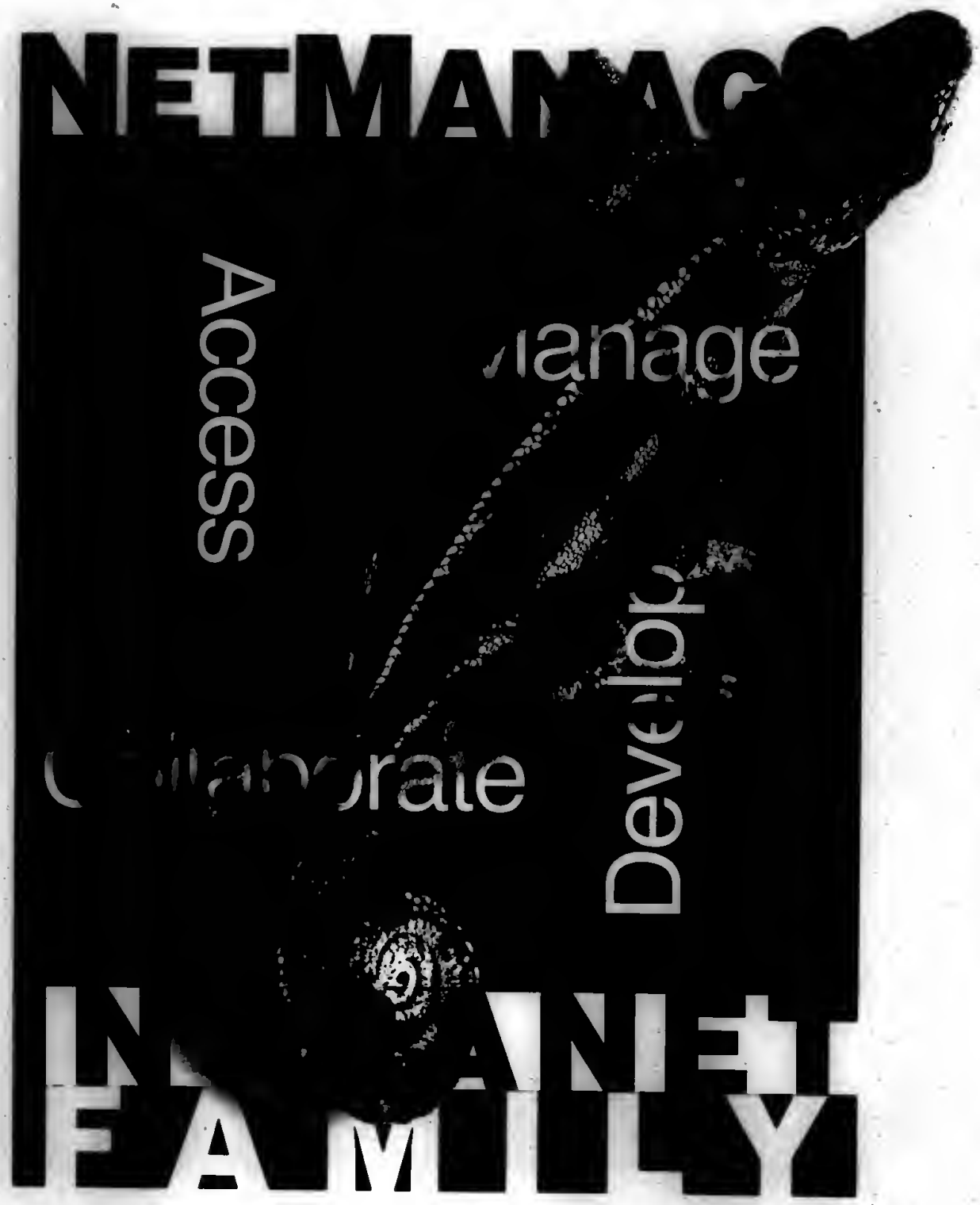

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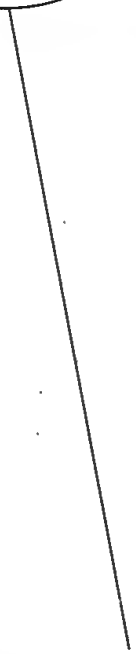

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Document management software helps speed new drug applications to FDA, 73

Corporate Strategies

GIS technology makes inroads

By April Jacobs
PALM SPRINGS, CALIF.

Government agencies and utility companies remain the primary users of geographic information systems (GIS), but mainstream corporations are beginning to navigate their way to the mapping technology.

In fact, increased corporate use of GIS technology to improve customer service and cut costs is expected to help propel the overall market from $862 million last year to $1.7 billion in 2000, according to Kathey Hale, a principal analyst at Dataquest in San Jose, Calif.

For example, retail giant Sears, Roebuck and Co. is installing a GIS-based system for routing the trucks that make 4 million home deliveries a year, according to Steven Rutkowski, senior systems manager at Sears in Chicago.

The project, which began in 1993 and will be completed this year, has helped Sears find the best routes for the 800 trucks that bring furniture and appliances to customers, he said.

Mapping technology

The GIS system has slashed the time it takes to map out a delivery route from about 2½ hours, based on the knowledge of local truckers, to 20 minutes. And Sears has been able to reduce drivers' mileage by nearly a mile per delivery.

"It actually took some of our facilities up to eight hours to produce routes, so it was astounding to us to see this go as fast as it did," Rutkowski said. The firm can give customers a two-hour time frame in which their goods will be delivered, as opposed to the previous a.m./p.m. window.

The system is based on IBM RS/6000 servers and Esri, Inc.'s Arc/Info GIS software, he said. Orders are filled by using Esri's ArcView desktop mapping tool, he said.

Address matching also has improved, Rutkowski said. Under the old system, trucks went to the right address 66% to 71% of the time; accuracy now ranges between 86% and 91%. Some facilities reach 96% accuracy.

Rutkowski wouldn't give the specific cost of the new system, but he said it will easily pay for itself within a year.

MetLife Realty *uses GIS technology to manage and review about $1.3 billion worth of property for investors*

MetLife Realty Group, Inc. in White Plains, N.Y., a wholly owned subsidiary of Metropolitan Life Insurance Co., also uses GIS. The firm, which manages about $1.3 billion in property for investors, is implementing a system it hopes will provide data that improves customers' return on investment.

With GIS, users can access data critical to evaluating a property's value and performance potential. Users in different departments also will be able to access information specific to the work they do. "At any given time, there's 300 properties in various stages of review over a period of one year," said Gilbert Castle, a consultant at MetLife Realty.

Hale said companies are making geography part of how they analyze their business. "You're talking about optimizing a business. I'm starting to see some companies leveraging spatial analysis in their business models," she said.

Vendors feed user frenzy for rapid application development

By Julia King

Forget re-engineering.

Companies want state-of-the-art information systems in record time, and systems integrators are coming up with more ways to provide them.

Hewlett-Packard Co.'s Professional Services Organization, Cambridge Technology Partners, Inc. (CTP) and Actium Corp. have all announced new or enhanced rapid application development programs.

"With technology life cycles so short and time to market being such a critical advantage, speed of implementation has become one of users' key [integrator] selection criteria," said Susan Tann, a senior analyst at International Data Corp. in Framingham, Mass.

HP is targeting its new R/3 rapid implementation service at midrange companies that require little customization.

To speed installations, it uses standard templates to define business processes. It also compresses the design, configuration and training phases of a traditional SAP AG implementation into a single four- to six-month period.

Using these techniques, HP claims it can cut the time and cost of R/3 implementations in half.

Set point

Systems integrators with fixed pricing

Systems integrators	Hewlett-Packard's Professional Services Organization	Cambridge Technology Partners	Actium
Expertise	Unix, client/server infrastructure; SAP R/3 implementation	Mission-critical client/server applications	PowerBuilder development; client/server applications
Service offered	Fixed-time, fixed-price R/3 implementations; four- to six-month implementation times	Fixed-time, fixed-price engagements; rapid deployment	Fixed-time, fixed-price engagements; gain-sharing contracts; rapid project completion

Reaching consensus

At JBL Professional, an audio equipment maker in Northridge, Calif., it took an HP team four months to implement the finance, sales and distribution, and control and materials management modules of R/3.

The total cost of the project, including software licenses, hardware and implementation, was just over $1 million.

"We had been receiving quotes [from other R/3 integrators] of a year to 15 months," said Dennis Barry, JBL's vice president of finance and administration.

HP's fixed price on the project was about one-third of what JBL expected to pay, Barry said.

CTP in Cambridge, Mass., and Actium in Conshohocken, Pa., develop custom applications using client/server and object-oriented technologies. Both firms work on a fixed-time, fixed-price basis.

CTP's methodology for bringing projects in rapidly and on budget concentrates on "gaining consensus so things get done quickly," said Chris Greendale, a co-founder and senior vice president of marketing at the $132 million firm.

In CTP's rapid solutions workshops, teams of developers from client sites are put together in a room for a week "and basically can't come out until they've reached a conclusion about the functionality they want to build," Greendale explained.

At the end of the week, the

Fast rollout, *page 73*

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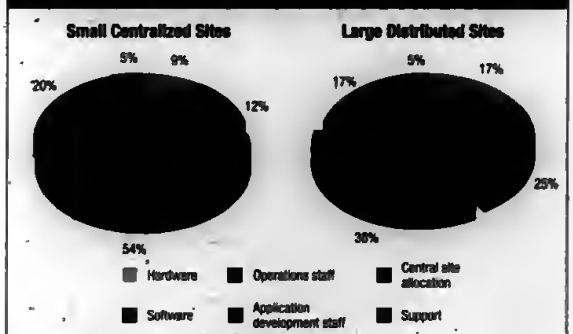
Meeting the Challenge of Client-Server Computing

Maximizing Return-on-Investment of Network Computing

The migration to client-server computing is affecting organizations both large and small almost everywhere on the planet. Computer users today have extensive access to global network-based resources, including communication gateways to other companies, individuals, and markets worldwide. Signs of this connectedness abound:

- Last year the number of LAN users worldwide hit nearly 100 million, double the number in 1993. By 1999 the number will double again
- In the same year the number of people in the world with electronic mail boxes topped 40 million. By 1999 the number will be over 125 million
- Groupware users numbered over 30 million worldwide by the end of 1995; by 1999 they will number over 250 million

Figure 1 — The Hidden Costs of Client-Server



Source: International Data Corporation, 1996

So we are heading for a wired workplace, a wired marketplace, even a wired society. However, there is a price to be paid for all this connectivity. The nearly universal implementation of client-server systems requires living with new levels of complexity and new hardware and software that people must be trained to use. Moreover, highly skilled personnel must be hired to install, manage, maintain, and administer these far-flung networks. The result is that staffing costs have become the largest contributor to total networked computing costs, regardless of the size of the installation (see Figure 1).

Until now, companies have justified the costs and complexities of client-server computing by competitive advantage–it is a very flexible and adaptable computing style. But when client-server is the norm, where will the competitive advantage lie?

IDC believes that companies that learn to manage their networked resources through technology and training will win out over their peers in the long run. Companies that understand the true costs and true benefits of client-server computing will generate quicker return for their investments. Companies that relentlessly optimize, integrate, and upgrade existing systems will stretch IT resources further and be able to reinvest sooner than competitors taking a wait-and-see approach.

Areas of Opportunity

IDC and Novell have teamed to produce this White Paper in order to help IT managers develop a strategy for maximizing return on investment in networked computing resources. It is the executive overview of three studies researched and written by IDC and sponsored by Novell. In the research it conducted,

Driving Down Networking Costs

GroupWise:

Typical annual return-per-user of 334%

Nearly $400,000 a year saved in phone costs at Farmland Foods

Courier costs cut $16,000 a year at Sheppard, Mullin, Richter & Hampton

NetWare 4:

On average 15% less expensive than NT Server from Microsoft

50% increase in users supported by a single server

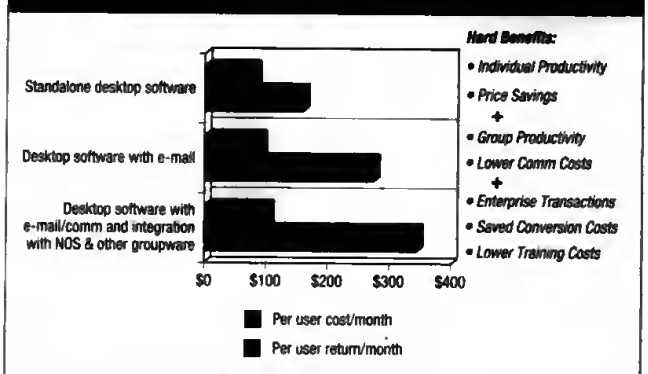
ManageWise:

$95,784 savings in business efficiency per 100 users

50% reduction in network downtime

19.7 day payback

Figure 2 — The Investment Leverage from Groupware



Source International Data Corporation, 1996

Figure 2 illustrates how electronic communication and collaboration generate cascading benefits. Standalone desktop software can impact individual productivity, but when combined with e-mail, that software can improve the productivity of a whole workgroup, not just the individual user. If the e-mail is specifically designed to work with the desktop software and with the network software, as say Novell's GroupWise is with NetWare 4.1, then those workgroup benefits are compounded.

This efficiency pays real dividends. When Sheppard, Mullin, Richter & Hampton, a Los Angeles law firm, made the move to GroupWise it found the support ratio for lawyers dropped from one assistant for every two lawyers to one for every three. GroupWise scheduling cut countless hours in tasks as routine as setting up meetings; GroupWise e-mail cut courier costs by $16,000 a year.

IDC found three areas of networked computing that are focal points for ROI leverage:

1. The choice and use of communication applications such as e-mail and groupware
2. The choice and use of next-generation network operating systems
3. The use of advanced network and system management tools

In addition, IDC found that when products in support of all three of these areas work together in an integrated fashion—such as Novell's GroupWise, NetWare 4.1, and ManageWise products—benefits are compounded. Support and training costs are lower, conversions and upgrades occur faster, applications come on stream sooner, and downtime is reduced.

Applications for the Next Wave

The migration to client-server computing is a quest to provide users with access to information and computer resources beyond their desks. One of the key tools for this is groupware software, epitomized by Novell's GroupWise, software which integrates e-mail with scheduling, calendaring, and other workgroup oriented functions. The market for groupware is exploding as organizations find they can use it—specifically the e-mail function—as a platform for providing workgroup and even enterprise-wide access to information and resources.

In the research IDC conducted, almost half of the business benefits organizations received from migrating to groupware came from better internal and external communications. For instance, Farmland Foods, a $2 billion dollar meat processing company, found that since installing GroupWise, documents once faxed in 15 minutes now take less than five to e-mail. Further, the use of GroupWise saved almost $400,000 in voice phone calls a year.

For most companies, an investment in groupware is considered an incremental cost. The hardware is already in place, as is the network. Moreover, the support costs—which account for more than 50% of the cost of operating a networked PC—are shared across dozens of applications.

But even with all the hardware, network, and support costs amortized across the groupware software, it's a bargain. IDC's research with Novell's GroupWise customers found that a typical installation required only about $250 in fully-loaded first-year costs—less than 5% of the annual cost of operating and supporting an end-user personal computer.

For that $250 investment, those same GroupWise customers found that their first-year return was over $800 on lowered communication and clerical costs alone. Meanwhile, they accrued an array of other concrete benefits, such as fewer meetings (and thus less travel and meeting administration), easier document handling, and so on. For every single GroupWise customer interviewed by IDC, return-on-investment exceeded expectations.

Modernizing the Network

If the LAN is the heart of client-server computing, then the network operating system is its soul. As LANs have evolved from peripheral information systems to the primary components of mission-critical systems, they have become more robust and more scalable. Along the way they have also provided IS personnel with the tools to manage network resources as never before.

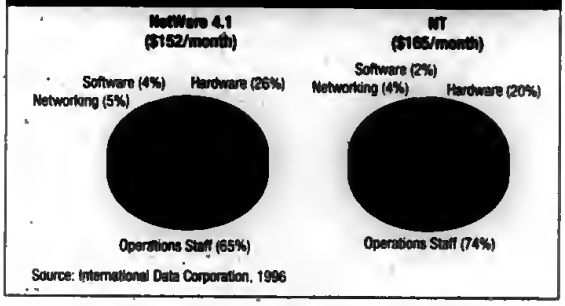
In fact, powerful new management capabilities are why many people are migrating to NetWare 4.1. With more than 375,000

licenses installed worldwide as of 1995, it is the most popular network operating system. Three key reasons for its popularity are:

- Greater functionality
- Improved management
- Directory services

Figure 3 illustrates how survey respondents believe migrating to NetWare 4.1 has enhanced network productivity—with ease of administration at the top of the list, mentioned by nearly 40% of respondents. NetWare 4.1's greater functionality has promoted companies' reliance on LANs and delivered on the ultimate promise of client-server—increased productivity.

Figure 4 — Network Cost-to-Use at Medium (300 User) Sites (Costs After Migrating from NetWare 3.X)

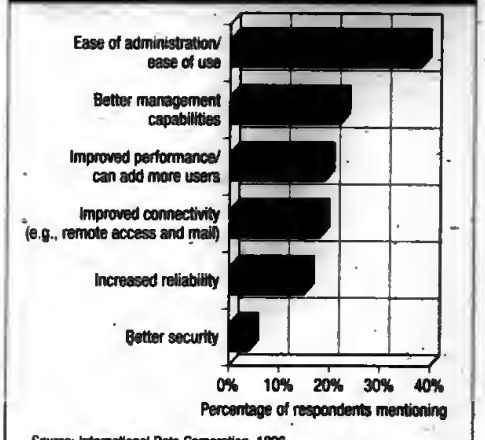


Source: International Data Corporation, 1996

According to recent surveys conducted by IDC, LAN managers report remarkable improvements in managing their networks under NetWare 4.1. Although they expected the number of nodes on their networks to grow by 260% in the 12 months following installation, they anticipated the number of file servers on the network would grow by only 163%. In other words, under NetWare 4.1, they expect to increase the ratio of users per server from 41 to 60—an improvement of 50%.

In addition to increasing the number of users per server, NetWare 4.1 provides a single point of administration with Novell Directory Services (NDS) that results in a lower cost of network administration. Figure 4 shows how, in medium-sized sites, NetWare 4.1 generates 14% lower network administration costs than Microsoft NT, primarily by increasing the user to support staff ratio.

Figure 3 — How NetWare 4.1 Improves Network Productivity



Source: International Data Corporation, 1996

Novell and other networking companies have set their sights on developing new technologies that will make tomorrow's networks more efficient and flexible. Novell has developed a Smart Global Network strategy, which entails making the network available to anyone—anytime, anywhere. An essential component of the Smart Global Network is Novell Directory Services (NDS), which enables companies to keep track of and connect all of a network's users, workgroups, hardware and software on one common access and administrative framework. NDS provides directory services technology that can handle the management of countless resources on heterogeneous systems spread around the globe. Also fundamental to Novell's vision of the future is an open set of application programming interfaces (APIs) that will make it easy to incorporate NDS and other NetWare 4 networking services into distributed applications.

Providing End-to-End Network Management

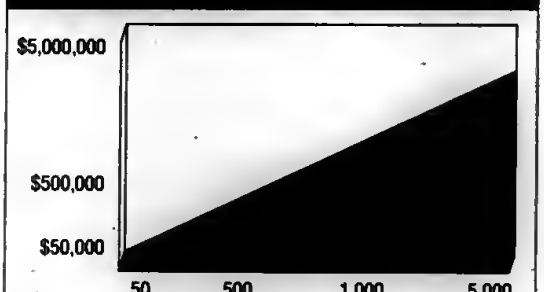
Staffing costs and end-user productivity are the issues that keep IS managers awake at night. And that has never been more true than it is today. As networks expand and intertwine, the critical success factors for network managers will include:

- Increasing network uptime, both in operation and when installing new users or applications
- Increasing efficiency by supporting rapid network growth without commensurate growth in staff
- Increasing responsiveness, fixing problems in a way that minimizes idle time for users or within business processes

To meet these needs, Novell offers ManageWise. It combines both network management and PC administration into a single, integrated package. Previously, most PC administration and LAN management products worked independently of one another, each requiring dedicated staff and resources.

ManageWise is the integrated solution that offers a single view of the network. It provides analysis tools for understanding bottlenecks; permits the configuration, inventory, and diagnostics of PCs from a single local or remote site; and provides tools for monitoring and managing remote and local servers. IDC's research demonstrates that even small and medium-sized companies can achieve significant cost savings by implementing ManageWise (see Figure 5). Network managers found that the most significant gains in efficiency were realized in server operation and help desk functions. Using ManageWise also increased LAN manager responsiveness. Before implemenration, only 30% of network or end-user problems could be solved from a central site; afterwards, that number rose to 60%. This is especially important for companies with highly decentralized operations.

Figure 5 — Average Annual Savings From ManageWise



Source: International Data Corporation, 1996

Since the software-licensing, maintenance, and training costs of a product like ManageWise are low compared to the number of users potentially affected, the return on investment can be surprisingly high. Across the survey base polled by IDC, ManageWise paid for itself on average within 19.7 days.

For every 100 users, implemenring integrated management with ManageWise saved $95,784 annually. These savings are attributable to the following:

- More efficient systems management, including an increase of 33% in the number of servers and 25% in the number of PCs a staff person can support, and a decrease in travel of 53%, leading to annual cost savings of $14,500
- Significant reductions in the time required to perform key management tasks—such as five hours in moves and changes, nine hours in server maintenance and configuration, seven hours in help desk and support, four hours in problem tracking, three hours in printer maintenance, etc.—saving $30,844 annually
- Dramatic reductions in network downtime (over 50%) due to network outages, delays addressing problems at the desktop, or time spent installing and configuring applications, generating annual savings of $50,440

Cost-Savings and Client-Server: They Aren't Mutually Exclusive

Believe it or not, return on investment in networking can be quantified. While it may sometimes seem that networks are growing out of control, vendors like Novell are in fact working diligently to develop products for simplified, easily managed local, wide-area, and global networks. Because of the strategic and financial advantages of networking wherevet systems reside and users roam, organizations will be forced to expand the reach and complexity of their networks simply to remain competitive.

Astute companies will concentrate on migrating to client-server computing in ways that maximize both the resources available to run networks and the effectiveness of those who ultimately generate revenues and profits—namely, end users.

Call to Action

This is an executive overview of a three-part series of White Papers entitled:

- **Novell GroupWise: Leveraging Desktop and Network Investments**
- **Novell NetWare 4.1: Reducing Cost of Ownership**
- **Novell ManageWise: Maximizing Returns on Networking Investments**

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Document management helps medicine go down

Pharmaceutical firms speed new drug applications to FDA

By Thomas Hoffman

A new drug can be worth up to $1 million a day to pharmaceutical companies that reach the market first, so every second counts in the race to submit new drug applications (NDA) to the U.S. Food and Drug Administration.

The trouble is, NDAs involve gigabytes of data and have to be shuttled among a slew of departments such as clinical research and drug regulatory affairs for viewing and approval.

To get its NDAs out the door faster, Hoechst Marion Roussel, Inc. installed a document management system that automated most of its manual data-gathering processes.

The result: What normally would have been a 40-week NDA for Dolasetron, a drug that prevents nausea and vomiting in chemotherapy patients, was slashed to 17 weeks. The NDA for Fexofenadrine, an antihistamine, was reduced from 52 weeks to 24 weeks.

Hoechst is able to project these time lines based on historical patterns and how long it normally would have taken to complete such projects with the same amount of data.

Hoechst early year last began installing a set of custom packages from Waltham, Mass.-based Interleaf, Inc., such as Interleaf 5, WorldView and Interleaf RDM.

About 30 Hewlett-Packard Co. Unix workstation users share the documents via TCP/IP Ethernet connections to HP 9000 Unix servers. Another 250 staff members can view the documents and write ancillary reports.

Quick deployment

Because Dolasetron and Fexofenadrine were in the pipeline before the document management project began, Hoechst had to hustle to get the system operational.

"That was our biggest challenge — we had to get a lot of servers in quickly and increase the bandwidth on the network," said Mike Armstrong, manager of systems integration at the Kansas City, Mo.-based firm.

By putting the servers on a "city" Ethernet ring, Hoechst was able to achieve network speeds of 100M bit/sec.

Hoechst spent $6 million on the system, with about $4.3 million going to Interleaf for software and consulting services, Armstrong said.

After the system went live last March, Hoechst was able to submit NDAs on Fexofenadrine in July and Dolasetron in September.

The FDA hasn't approved the drugs yet, but the time the system saved Hoechst may prove critical in the long run, industry experts said.

"Document management has become a key area for these companies as they work with the FDA," said Scott McCready, principal at IDC/Avante, a market research firm in Framingham, Mass.

For example, it isn't unusual for pharmaceutical researchers to spend as much as 25% of their time looking for documents, McCready said. "It's amazing how many pharmaceutical companies focus too much on research and not the documentation," he said.

He said DepoTech Corp. in San Diego, Hoffmann-LaRoche, Inc. in Nutley, N.J., and Glaxo Wellcome in London are the leaders in using technology for working with the FDA.

Hoechst Marion Roussel's new document management system helped the company get its new drug applications to the FDA faster

	Approval time before the new system*	Approval time after the new system
Dolasetron (prevents nausea and vomiting in chemotherapy patients)	40 weeks	17 weeks
Fexofenadrine (antihistamine)	52 weeks	24 weeks

*Estimate

Fast rollout

CONTINUED FROM PAGE 71

team presents its systems requirements to its company's top executive sponsor.

"We have had 100% success with that technique because not one person on the design team wants to fall on their face when the CEO comes in," he said.

Both sides benefit

Actium's rapid development method involves breaking large projects into several time chunks, each with a set deadline, price tag and payback. The integrator also has a library of more than 100 business objects, which it uses as a starting point on most new object-oriented applications.

Actium also will work under a so-called gain-sharing arrangement. If a gain-sharing project comes in ahead of time and under budget, the client and integrator split the savings. If the integrator misses the deadline or runs over budget, all work beyond the original scope of the contract is performed at a reduced rate.

Shell Oil pumps out global standardization success story

By Rebecca Sykes

What happens when IS managers at a large international company decide to adopt a standard end-user query tool for their desktops?

Managers may hanker for the many benefits of standardization, ranging from simplifying application rollout to saving time and money by using a centralized test site to assess technology. But reaping those benefits requires sowing the seeds of cooperation and compliance. Information systems managers at multinational Shell Oil Co. found this out.

Corporate poll

Shell's first step toward getting the same query tool on its desktops around the world was to find out what users wanted that tool to look like. Shell's central IS group in London surveyed end users at the corporation's operating companies in about 140 countries.

The results were unequivocal: Users wanted better, easier access to existing information rather than snappy new features and formats.

After whittling down a list of 27 products to four competing data access products that were tested in Shell's Philippines operating company, Business Objects came out on top. It is from a French relational database query tool maker of the same name.

Business Objects lets people use business terms such as "customer" and "product" rather than database terms, thus lowering the skill threshold required to query a database, said Simon Bennett, who is responsible for end-user access to data at Shell Australia in Melbourne.

Though the central IS group in London recommended Business Objects, it didn't decree that users adopt it, said Shell spokesman Quentin Langely. Rather, the group sought standardization through persuasion and attrition at the local level.

At Shell U.K.'s Exploration and Production division in Aberdeen, Scotland, persuasion fell to Helene de Beer, application standards manager and planner. De Beer's division has an information technology staff of 120 people who, in turn, advise 3,200 users in three locations in Great Britain.

De Beer's strategy was to make use of "cutting-edge" users — that small group of employees at any company with a zest for trying new technology.

Query tools

"Once you've got one person who can illustrate the use and the advantages ... [of new technology, you] start building a network" of users, de Beer said.

Project takes off

For de Beer's division, the initial project was a database of helicopter and airplane flight schedules to and from Shell's offshore platforms in the North Sea. Shell used Business Objects to retrieve statistics on flight use by asking questions such as how many flights were canceled or how many flights had fewer than a certain number of people on board at a given time.

The database worked well and provided de Beer with a real-life example from a Shell-specific application. "I've found that works best" to persuade people, de Beer said.

Human nature proved on different Down Under.

Bennett's users had been using Microsoft Corp.'s Access to query corporate data, according to Bennett. As far as Shell Australia employees were concerned, Microsoft's tool had one very muscular advantage, which rendered the question of accessibility with Access almost beside the point: They were already using it.

Shell Australia started out slowly down the standardization road, with 12 pilot users in its Finance and Aviation divisions. But behind the scenes, the going hasn't been easy.

"Technically, we have had a number of irritating problems implementing [Business Objects] into our environment," Bennett said. For instance, local security policy prohibits Bennett from having a nonrecurring password, so every 60 days, the passwords in Business Objects must be redefined and the encrypted user identification/password must be manually copied to each user location. "Currently, this is not too bad because of the small user base, but [it] may become an issue for us later," Bennett said.

IS staff time can be a major component of an implementation's expense, and minimizing that difficulty can help ensure the adoption of the technology. One way the central IS office in London helps its worldwide users with maintenance issues is by sending out a Business Objects newsletter.

But the success or failure of standardizing on a tool comes down to whether users actually use it. Currently, 1,900 employees work with Business Objects, according to a Shell spokesman. The number of users will probably grow to 5,000, though that will take some time, he added.

Sykes writes for the IDG News Service's Boston bureau.

Computerworld Editorial Calendar

July - October, 1996

Issue Date	Ad Closing Color*	B&W	Editorial Features	Show Distribution & Related Supplements
July 1	June 14	June 21	**Closer Look:** Trends in desktop hardware and servers	
July 8	June 21	June 28	**Buyer's Guide to High-Speed Modems:** With users turning to the World Wide Web and demanding remote access to graphically-intensive applications, modems are playing an increasingly important role in corporate life. This Buyer's Guide will explore state of the art modem technology, look at where new modems work or need work, and help IS managers decide which class of modem is right for their applications.	**Informix User Group** Chicago 7/9 - 7/12
July 15	June 28	July 5	**Closer Look:** Intranets Lessons learned **IS Leadership Series**	
July 22	July 5	July 12	**Managing:** The IS executive as entrepreneur **Intranet Series**	
July 29	July 12	July 19	**Buyer's Guide to Sales Automation Software:** When IS moves to give sales representatives new tools to make sales presentations and log orders, a broad variety of technologies converge — notebooks, remote access software and databases. This Buyer's Guide will look at how IS managers address the special needs of the crucial application, and examine some of the commercially-available software designed to meet their needs. **Special Report:** Data Warehousing Second in a two-part series focusing on using and managing data warehouses. This issue will profile best-in-class examples of data warehousing and look at applications in data mining.	
Aug.	June 26		**Computerworld Client/Server Journal** Extended Enterprise: Managing dispersed groups of programmers Product Focus: Application development (GUI builders, compilers, componentware, tool suites, HTML page builders) Careers: Skill-ware — does it work?	**Harvey Study** Object World, CA World, Networks Expo, Mobile World, Networld + Interop, SIM Fall Conference
Aug. 5	July 19	July 26	**Closer Look:** E-mail integration Approaches to the thorny problem of making multivendor e-mail environments work together	
Aug. 12	July 26	Aug. 2	**Buyer's Guide to Internet Security:** Corporations may be flocking to the Internet, but they are doing it with a wary eye. Fear of hackers and other security concerns have kept the corporate world from taking full advantage of the Internet's capabilities. This Buyer's Guide will look at firewall products and other technologies designed to support robust but secure Internet applications. **Special Report:** The Future of Computing	
Aug. 19	Aug. 2	Aug. 9	**Closer Look:** Object Databases **IS Leadership Series**	**Object World** Starch San Jose Study 8/20 - 8/22
Aug. 26	Aug. 9	Aug. 16	**Buyer's Guide to PC LAN Management Products:** How do you keep the departmental systems running without dedicating an IS staff member to tasks such as backup and access management? A variety of products help IS off load those responsibilities, and they work in cooperation with enterprisewide systems management packages. This Buyer's Guide will look at the strengths and weaknesses of some of those LAN-level management products, and explore user needs. **Intranet Series**	**CA World** New Orleans 8/25 - 8/30
Sept. 2	Aug. 16	Aug. 23	**Special Report:** Salary Survey Computerworld's annual salary survey captures salary levels for IS professionals from the CIO to help desk operator. A major undertaking, the survey results are broken down by company size, region and industry.	
Sept. 9	Aug. 23	Aug. 30	**Closer Look:** Netware **Special Supplement:** Network 25 A joint Computerworld, Network World special 60-page magazine profiling outstanding users of networking technology from around the world. In addition to a listing of 25 outstanding organizations and detailed company profiles, the issue will examine regional differences in networking, trends in technology and useful advice on emerging networking issues.	**Networks Expo** Starch Dallas, 9/10 - 9/12 Study **Mobile World** Boston, 9/10 - 9/12 **Internet Commerce Expo** Anaheim, 9/10 - 9/12
Sept. 16	Aug. 30	Sept. 6	**Buyer's Guide to Internetworking:** With demand for bandwidth still on the rise, users are turning to technologies such as fast Ethernet and token ring switches. This Buyer's Guide will look at how users are addressing the bandwidth challenge and which products best meet their needs. **IS Leadership Series**	**Networld + Interop** Atlanta 9/16 - 9/20
Sept. 23	Sept. 6	Sept. 13	**Managing:** The best new books for IS managers **Special Report:** Top Web sites for IS managers **Intranet Series**	
Sept. 30	Sept. 13	Sept. 20	**Buyer's Guide to Groupware:** The old groupware model went out the window with the emergence of the World Wide Web. Now, products such as Lotus Notes, Microsoft Exchange and Novell Groupwise XTD are being repositioned to act as gateways to the Internet. This Buyer's Guide will look at how those server-based products are handling the transition, and at some of the Web-based alternatives being offered by startups.	**SIM Fall Conference** San Francisco 9/29 - 10/2
Oct.	Aug. 21		**Computerworld Client/Server Journal** Extended Enterprise: Road warrior war stories Product Focus: Networking (routers, network management suites, diagnostic tools, intranet components) Careers: The end of the specialist	**Unix Expo** Software Developers' Conf.
Oct. 7	Sept. 20	Sept. 27	**Buyer's Guide to RISC Servers:** Enterprisewide applications often are being driven by multiprocessor servers based on Reduced Instruction Set Computer technologies such as PowerPC, Alpha, Sparc, MIPS and PA-RISC. This Buyer's Guide will explore the challenge of running the corporation on these products, and the strengths and weaknesses of some of the key vendors.	**Unix Expo** New York 10/8 - 10/10
Oct. 14	Sept. 27	Oct. 4	**Closer Look:** Videoconferencing Is it really ready for the desktop? A look at the state of the art in the PC space.	

* Includes ads within special editorial features and premium positions

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Computerworld Editorial Calendar — October - December, 1996

Issue Date	Ad Closings Color*	B&W		
Oct. 21	Oct. 4	Oct. 11	**Buyer's Guide to Notebook PCs:** They are the core computing platforms for a growing percentage of corporate users. Designed to work in hotel rooms, airports and in the office, notebook PCs pack the punch of desktop systems but carry their own set of technical challenges. This Buyer's Guide will examine the strengths and weaknesses of leading notebook vendors, and explore some of the issues that user organizations face when they roll out notebook-based strategies. **IS Leadership Series**	
Oct. 28	Oct. 11	Oct. 18	**Closer Look:** Java Development **Intranet Series** **Annual Computerworld Campus Edition** (actual mail date October 31)	**Software Developers' Conf.** Washington, DC 10/29 -10/31
Nov.	Sept. 25		**Computerworld Client/Server Journal** Extended Enterprise: Streamlining the virtual corporation Product Focus: Databases (modeling, management, query, analysis and reporting tools) Careers: New skill sets for on-line application development	Comdex Fall Database/Client Server World DB Expo
Nov. 4	Oct. 18	Oct. 25	**Buyer's Guide to Network Operating Systems:** Complex, enterprisewide applications need a robust network operating system to be working in the background. This Buyer's Guide will explore the NOS buying process, and examine how well NOS products such as Windows NT, Netware, Banyan Vines, and OS/2 Warp Server support the corporate user.	
Nov. 11	Oct. 25	Nov. 1	**Annual Computerworld Skills Survey:** Where is the talent going? What skills do you need to succeed in an IS career? This expanded feature details which IS skills are most in demand – by region, industry and technology – and which ones are bringing IS professionals the greatest rewards.	
Nov. 18	Nov. 1	Nov. 8	**Buyer's Guide to Multimedia PCs:** The day of the simple DOS-with-floppy-and-hard-drive PC has long passed. Today's applications demand video and sound, not just a blinking cursor. New generations of processor chips pack power, and they are tightly integrated with video and sound technology, high-speed CD-ROMs, speakers and huge-capacity disk drives. This Buyer's Guide will examine the high-end desktop product offerings of key vendors, and explore the technology path being carved out by the industry at large **IS Leadership Series**	**Comdex Fall** Las Vegas 11/18 - 11/22
Nov. 25	Nov. 8	Nov. 15	**Closer Look:** Outsourcing/systems integration **Intranet Series**	Starch Study
Dec. 2	Nov. 15	Nov. 22	**Buyer's Guide to Decision Support Tools:** CEOs and other executives are demanding new levels of dynamic access to corporate data. They need reports that will help them make strategic decisions. That leaves IS managers to implement technologies such as OLAP and ROLAP and links that deliver relational data through new vehicles such as the World Wide Web. This Buyer's Guide will examine some of the key decision support tools, and explore how user organizations are leveraging new technologies to support executive decision making.	**DB Expo** New York 12/2 - 12/6
Dec. 9	Nov. 22	Nov. ** 27	**Closer Look:** Software license management **IS Leadership Series**	**Database/Client Server World** Chicago 12/10 - 12/12
Dec. 16	Nov. 29	Dec. 6	**Buyer's Guide to Futuristic Technologies:** Technologies such as virtual reality display devices and sophisticated pagers may have a place in many corporate applications. This Buyer's Guide will examine some of the advanced technology products that actually may prove useful for IS managers and their staffs. They aren't just for fun and games anymore. **Intranet Series**	

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Issue Date	Ad Closings		
Aug. 12	May 31	**White Paper:** **Supply Chain Management** (Part 3 of 4-part Manufacturing Directions Series)	
Aug. 19	June 21	**White Paper:** **RAID** (Part 2 of 4-part Enterprise Storage Management Series)	**Object World**
Sept. 2	June 21	**White Paper:** **Financial & Human Resource Applications** (Part 3 of 4-part Enterprise Software Directions Series)	
Oct. 14	Aug. 16	**White Paper:** **Hierarchical Storage Management** (Part 3 of 4-part Enterprise Storage Directions Series)	
Dec. 2	Sept. 27	**White Paper:** **Network & Systems Management: Adapt for Change or Get Out of the Way** (Part 4 of 4-part Manufacturing Directions Series)	**DB Expo**
Dec. 9	Sept. 20	**White Paper:** **Systems & Network Management** (Part 4 of 4-part Enterprise Software Directions Series)	**Database/Client Server World**
Dec. 16	Oct. 18	**White Paper:** **Client/Server Backup** (Part 4 of 4-part Enterprise Storage Directions Series)	

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Managing

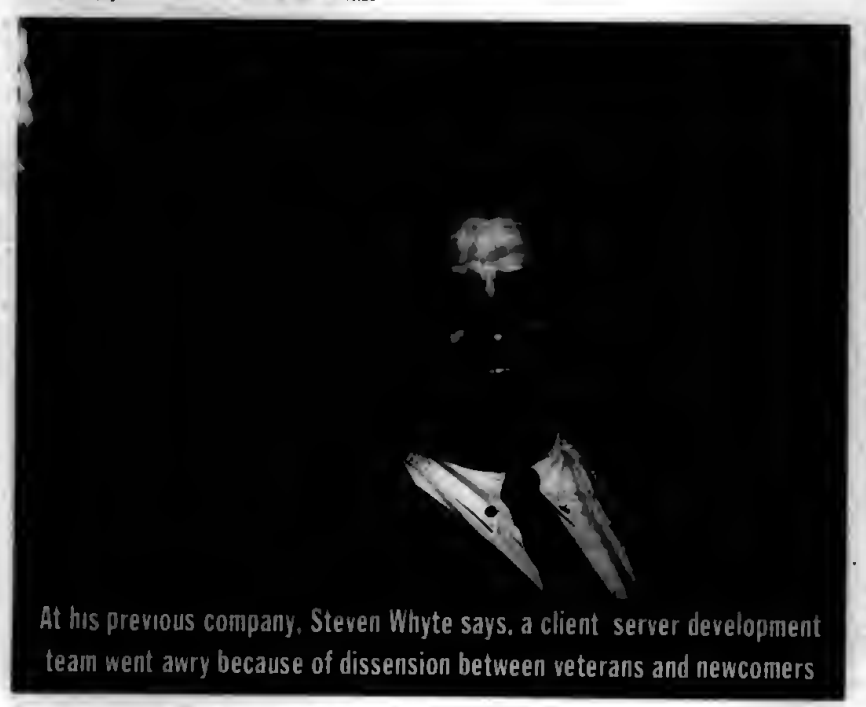
One Steamed

That's what you could wind up with if you mix veterans and young newcomers on the same development team and you don't manage it well

Fire and water. Cats and dogs. Gingrich and Clinton. And, as Steven Whyte can tell you, veteran and novice software developers belong on the same list.

At Whyte's previous company, his boss added three younger, inexperienced members to a seven-person client/server software development team. The trio, full of technical expertise but lacking procedural smarts, ran amok. When a task needed to be done, one of the three was likely to do it — without telling anyone or checking whether someone else was already working on it. Or, when older programmers would question a newcomer's code, wondering why it was done a certain way, the answer was usually a know-it-allish, "This is easiest." Arguments and delays marred the project. "It was hell," Whyte recalls.

Management wasn't much help at resolving the problem. "There was never a plan or procedure on how the work was to be issued," Whyte says. "The manager didn't describe the roles of anybody involved." Whyte is now a senior technical staff member at Questra Consulting, a consulting and software development firm in Rochester, N.Y.



At his previous company, Steven Whyte says, a client server development team went awry because of dissension between veterans and newcomers

Information systems managers routinely mix veterans and relatively inexperienced developers on software projects. The practice is supposed to be a great way to mentor younger programmers, the stuff learning organizations are made of. But experiences such as Whyte's are more common than not. According to a four-year, $1.5 million study of high-performance software development teams completed earlier this year, groups that mixed veteran and novice developers fare worse than teams where everyone is at the same experience level — even worse than teams where everyone is inexperienced [CW, Feb. 12, page 68].

"When experience is spread, performance and effectiveness of teams really falls," says Mehdi Ghods, senior principal scientist at The Boeing Co.'s Information Systems Division. Unless the team is sensitively directed and well-trained, he says, inexperienced people are going to hold up progress. (Boeing and IBM funded the study, which was conducted by two professors, Boston University's P. J. Guinan and Jay Cooprider at the University of Texas at Austin.)

And what about the project manager? It turns out he's not much good at resolving the infighting. These two-way conflicts are really three-pronged challenges for any organization seeking effective performance from its software development teams.

The first challenge: The old guys don't want to teach. .

Teach? Sometimes these guys barely want to talk.

"Software engineers tend to view their job as a solo performance," explains Watts Humphrey. Humphrey, author of *Managing the Software Process* and *A Discipline for Software Engineering*, ran IBM's software development efforts before retiring 10 years ago and becoming a fellow at the Software Engineering Institute at Carnegie Mellon University in Pittsburgh. In his experience, programmers lack both interpersonal skills and the desire to acquire them. "There are some very experienced engineers out there who are very hardheaded. It's the 'old dog, new trick' problem."

"It does happen," Ghods concurs. "The more experienced team members display less tolerance for training people."

This is complicated by the resentment, jealousy and anxiety older programmers may feel about newcomers' more up-to-date technological expertise [CW, Jan. 29]. Faced with young know-it-alls, an experienced programmer will turn off what few social skills he might have had in the first place.

Ghods, for instance, has seen experienced pro-

▶ Paul Strassmann explores the high turnover rate among CIOs. Page 83.

Team

By Jeremy Schlosberg

Make 'em talk

Looking to improve communication between the veterans and the rookies? Here are five suggestions:

- Make it clear to the team that learning is a two-way street — each side will have things to teach the other.
- Put a guru on the project, but make sure he knows that bringing inexperienced people along is part of the job, and it'll pay off on the next project.
- Earmark projects that are good for programmer training vs. projects that are suitable critical, and allocate experienced and inexperienced programmers accordingly.
- Train everyone in project management. Chances are no one has had much of it so far.
- Hire well. The Windows Support Group's George Roukas says, "I'd much rather have people who are hungry and only stay a year or two than have people who can't learn quickly. By their nature, they'll be around for a long time."

grammers refuse to pass knowledge along to newcomers who don't appear to "accept them as senior people or appreciate their experience." "There are a lot of egos involved," Whyte says. "It can become a 'watch your back' kind of environment."

Some of this resentment is understandable. IS regularly turns the traditional master/apprentice relationship on its head. The "apprentices" often arrive in the workplace with more skills than the "masters," and they know it. That leads to the second challenge: young turks who don't want to learn.

Ghods has seen it in the trenches. "The junior person may think, 'I know object-oriented programming, and you, as a senior person — a Fortran developer — don't.' The senior person feels they have "a lot to offer anyway because the issue isn't technology; it's software development." It's a subtlety that's sometimes lost on such newcomers.

Besides the young and arrogant, there's also the young and passive. They show so little interest in learning from veterans that the veterans lose interest in teaching.

George Roukas, vice president of business development for the Windows Support Group, a Manhattan-based software developer, says the passive camp is divided into roughly two elements. The first might be deemed passive-aggressive: people who employ a disinterested veneer to irritate those they encounter. "I've definitely had programmers who made that a high art form," Roukas says.

The second group, which is probably larger, comprises people who just don't know how to learn with enthusiasm and engagement, Roukas says. "They're sort of training couch potatoes," he says. Teaching someone who doesn't appear to be absorbing anything is trial enough for an experienced schoolteacher, never mind a software developer who would much rather produce something than teach someone in the first place.

All of these dynamics make the third challenge especially frustrating: The managers won't address the old-timer vs. newcomer issue head-on. It's the kind of nitty-gritty, touchy-feely manager stuff that isn't handled well in IS organizations, Humphrey says.

"Software engineering is a mix of the behavioral and the technical," he explains. But the human element is just what's overlooked in academia and business.

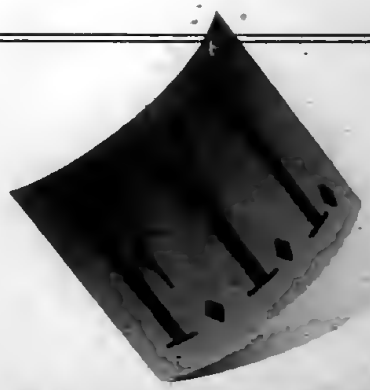
"The manager has to be good at communicating exactly what he's looking for on each side," Whyte says. By contrast, Whyte recounts a recently completed project at Questra that mixed veterans and newcomers. Each function point of the project was broken into smaller tasks and then rated by difficulty. The experienced members concentrated on the tougher tasks and the less experienced developers on the easier jobs. But as the project progressed, Whyte says, some of the less experienced people began handling some more difficult tasks because the project leader saw they could without compromising the schedule.

All this wouldn't have been possible without "exceptional communication" among the project leader, the experienced developers and the novices, Whyte says. Sometimes the veterans instruct the younger staff members, and sometimes the newbies — such as the programmer teaching Whyte about the Internet — teach the veterans.

But this picture of one big, happy software development family doesn't appear to be the norm. To Humphrey, the Boston University study's revelations regarding mixing veterans and rookies is sadly predictable.

"What you have, essentially, is somebody playing baseball and someone else playing soccer," he says. "You can't make a very good team out of that." ■

Schlosberg is a freelance writer in Cincinnati.



Insights for visionaries

Finally, a short book on information systems management that's long on substance.

V. Sambamurthy and *MIS Quarterly* Editor in Chief Robert W. Zmud, two professors at Florida State University in Tallahassee, have studied how to justify investments in "visionary" information technology applications. They're the risky, blockbuster systems that can throw open new opportunities for companies but are costly and tough to justify.

The result is a 129-page gem titled "Information Technology and Innovation: Strategies for Success." No dithering here — just clear and original findings, straightforward guidelines for action and case studies of seven carefully chosen companies.

V. Sambamurthy

Among the suggestions for getting funded are the following:

- **Get your story straight.** Picking the right strategy for communicating a project's benefits to others is the most important factor to win funding.
- **Match the pitch to the perception.** Does management peg IT as a support service? Focus on critical work processes. Is IS viewed strategically? Then link the project to a company's strategic vision.

Robert W. Zmud

- **Show them.** Create a video showing work processes before and after the new system is installed. It will help others understand the application.

But the monograph provides more than funding tips. It discusses how ideas for visionary systems arise and win acceptance, the role of the chief information officer and others in these projects, and the groundwork that CIOs must do in advance for these ideas to become realities. This is important stuff, particularly because the authors found that visionary projects can unseat CIOs *before* they start. Companies have hired new CIOs or third parties when the IS leadership lacked the technical credibility and vision to ensure the project gets done.

To order, call the Financial Executives Research Foundation, Inc. (affiliated with the Financial Executives Institute in Morristown, N.J.) at (800) 680-FERF. The cost is $35 plus shipping and handling. — *Allan E. Alter*

More F.Y.I., *page 80*

Go ahead. Judge it by its cover.

Look at the name on the outside. Look familiar? It's a name you associate with everything from chips to communications. In fact, it's the name you see inside most quality computers. And in these particular computers and servers, you'll also find the advantage of PowerPC™ technology. Plus the service and support you'd expect from a global corporation. Visit http://www.mot.com/computer/ or call your nearest reseller to find out more. Or call 1-800-759-1107, ext. PCW and ask us. After all, we know them inside and out.

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Power tools

Workflow for the masses

Process Model, a flowcharting and modeling program, can teach the uninitiated manager to think about workflow

Jeffrey Gordon Angus

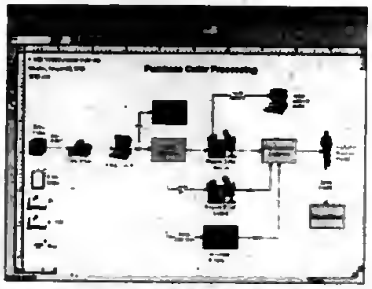
Process Model
Overall grade: B (Good)
Estimated price: $695
Promodel Corp.
Orem, Utah
(801) 223-4600

Process Model, a tool from Promodel Corp., was designed to create process flowcharts and use them as underlying models to simulate business processes. Though it was designed for knowledgeable people to test re-engineering proposals, I'd like to nominate this straightforward graphical program as a great way to prod the department managers whom information systems supports into understanding how their own departments work.

Process Model is built on top of a leading flowchart program — ABC FlowCharter from Micrografx, Inc. in Richardson, Texas. Using the bundled symbol palettes, you drag and drop symbols onto a page, thus connecting them.

The product is "smart" in important ways that make work easier and faster. Suppose you are a customer-service-minded manager at a busy bank branch, and you don't want customers to wait long to see a loan officer. As with conventional diagram-drawing programs, you create a flowchart linking a customer, a loan officer and a loan desk. What's different is that Process Model understands customers as events to be processed over and over again and loan officers as a limited resource. These smart connections allow for complex models that yield interesting results.

Once you've built the basic flowchart, you can assign probabilities, link the chart to already-created models and run the results through the simulation engine. You can show, for example, the probabilities of specific results. You can also calculate the costs of those results if you've attached dollar figures to choices. Process Model puts up an animated chart that shows the workflows and delivers analysis reports. It's easy to save an animated workflow chart, tweak conditions, run the process over again and compare results.



Process Model creates animated charts that show and analyze the workflow in action

Process Model requires Windows NT or Windows 95, a minimum 486 processor and 16M bytes of RAM because it makes extensive use of OLE. The beta version we tested isn't as snappy and responsive as Clear Software, Inc.'s Clear Process [CW, April 1], but it doesn't pay to judge the beta as a predictor of the delivered product's speed.

Strong points

And while Process Model's components don't integrate quite as smoothly as those of Clear Process, the product has some strong competitive traits of its own. For example, it comes bundled with the entire Micrografx ABC Graphics Suite. Beyond the flowcharting program, the suite includes Micrografx Designer, a sophisticated drawing program; ABC SnapGraphics, a great low-low-end drawing program; and other tools. These make for a muscular set of tools to publish and present your finished models.

The online help and printed documentation are still under construction. Unless there are major changes before it ships, the manual is very strong on detailing the program's components but doesn't explain how to perform specific tasks.

The beta version of Process Model is very easy to use for anyone with experience in process modeling. More important, it is a user-friendly program even for managers who have a hard time figuring out how to make their departments work better. Do your organization a favor and drop a few copies of Process Model into those hands. ■

Gordon Angus is a systems analyst at The Data Works Ltd. in Seattle.

More talkback on telecommuting

On Feb. 12, we ran a story on how to manage telecommuting information systems staff members ["home@sweet.home"]. Anthony Welst wrote us to say we had left out important questions about what happens when firing a telecommuting worker [CW, April 22]. He said telecommuters usually have equipment and data that would be hard to recover if that employee were terminated.

Several readers wrote to state their disagreement with Welst's position:

I think the question "what if you have to fire them" misses the whole point. Any data that is accessible by any employee is subject to compromise, regardless of whether the employee works from home or in a company office. How much data do you suppose can be compressed onto a diskette that fits in a shirt pocket?

Byron McKenna
Network Systems Corp.
Highlands Ranch, Colo.

I manage a staff of more than 15 individuals, most of whom have remote access to our corporate database. Some of those employees have their own PCs at home, and some have company-owned hardware. Whenever we have separated an employee, we have never experienced a problem with retrieving the company's property. My experience with telecommuting has been nothing but positive in terms of enhanced morale, enhanced productivity and personnel management. Whenever I ask any of my employees to put in some extra time, they respond because they know that they can do it from home if need be.

Larry Warehime
Nautica Enterprises, Inc.
New York

@ **You can always talk back to the Managing section editors. Send your comments to Allen E. Alter, Managing's senior editor, at allen_alter@cw.com.**

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The dangers of CIO turnover

Stories about the short corporate lives of chief information officers have regularly appeared in magazines for years. The information systems press commonly cites turnover rates of between two and three years.

By now, many IS professionals may shrug off CIO turnover as a fact of life that has little impact on their companies or careers. But turmoil at the top of the IS ladder is an important problem.

In the story about the three little pigs, the rationale for building a house out of straw is a short-term perspective. If CIO careers continue to be brief, firms can expect to operate with similarly flimsy systems.

It takes at least seven years to build a long-lasting, low-maintenance systems architecture. The planning cycle may extend well beyond 10 years in firms where the burden of maintaining legacy applications consumes most resources. It is impossible to maintain the necessary long-term perspective in firms where CIOs regularly come and go. Whether CIOs leave due to retirement, promotion, transfers, dismissal or exhaustion is immaterial. What matters is the sense of insecurity that occurs when commitments from leaders are expected to be short-lived.

Furthermore, instability at the CIO level is likely to accelerate the outsourcing of IS support services. It reinforces the prevailing tendencies toward chaotic solutions to systems management problems, such as frequently swinging from centralization to decentralization, trashing then rebuilding designs and looking to outsiders for know-how that should be homegrown.

With consequences such as these, everyone in IS should be concerned with CIO turnover.

THE SURVEYS

When tracing the origins of these statistics, I always ended up with three surveys: one from a major consulting firm and two from recruiting consultants.

In each instance, the average time a CIO held a job was either 25 or 28 months. A fourth survey, a recent study by Computer Sciences Corp. [*CW*, April 15], suggested that a CIO's time on the job may be somewhat longer, about 34 months.

The *1994 Computerworld Premier 100* survey also examined the question of CIO longevity. It concluded that the mean time CIOs held their positions was 6.1 years, with a median of four years. (There was one CIO who has been on the job for more than 25 years — clearly a candidate for a medal.) The Premier 100 were the best of the Fortune 1,000 in terms of information productivity and therefore not a representative sample. Nevertheless, I couldn't believe that the differences in job longevity between the U.S. average and the Premier 100 firms could be very large.

TAKING NAMES

I happen to have a good way to find out the CIO turnover rate. I have independently validated mailing lists of CIOs from 1994 and 1995. By merging the lists, I could see which names remained the same. From a list of 496 firms, only 232 names showed up in both years. Seventy-four firms changed CIOs in one year. That yields a turnover rate of 24.2%, or an average tenure expectancy of 30 months.

Of the remaining firms, 81 didn't list a CIO for either year. The fate of the CIOs at the other 109 firms is anyone's guess. The names of the CIOs were listed in one year but not the other. I have good reason to believe, based on random spot checks, that about half of those firms have replaced their CIOs without listing the newcomers' names. If that estimate is correct, the consultants' and recruiters' findings of 25- to 28-month terms is right.

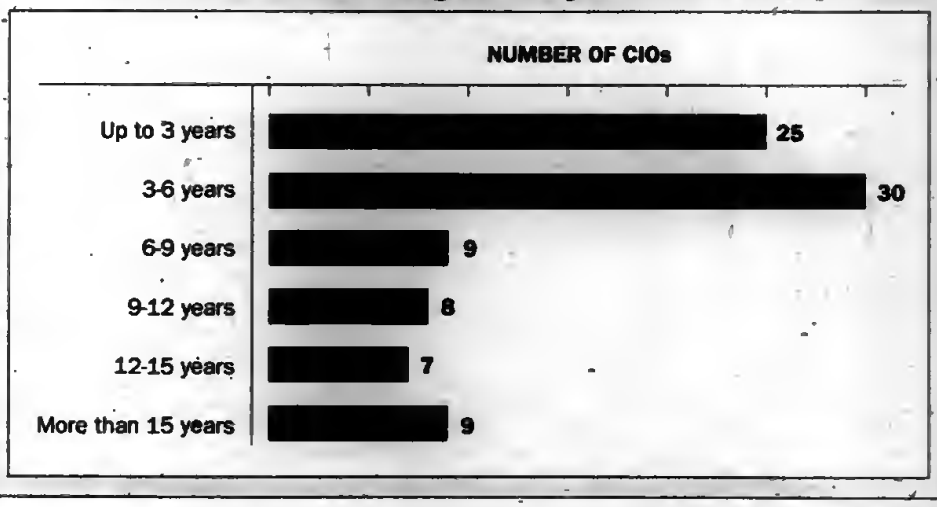
Many say the role of the CIO is to safeguard, develop and enhance a firm's information assets. That suggests CIOs should be in positions to make lasting commitments to build information infrastructures and develop talented systems people. But long-term commitments and short job tenures are inconsistent. In fact, the indifference of many CIOs toward the year 2000 problem is evidence that they didn't expect to be around and accountable for the predictable disaster that will surely befall their systems.

Such a casual attitude toward systems management is a telling symptom of the CIO turnover phenomenon. High CIO turnover reinforces a managerial attention-deficit disorder that makes our information technologies far less effective than their potential. ■

Strassmann held two corporate CIO jobs for four and nine years, respectively. He can be reached via E-mail at paul@strassmann.com or through his home page at www.strassmann.com/.

How long on the job?

Eighty-eight CIOs from the *1994 Computerworld Premier 100* survey were asked how long they've been in their current jobs. Thirty-three have stayed put for at least six years.

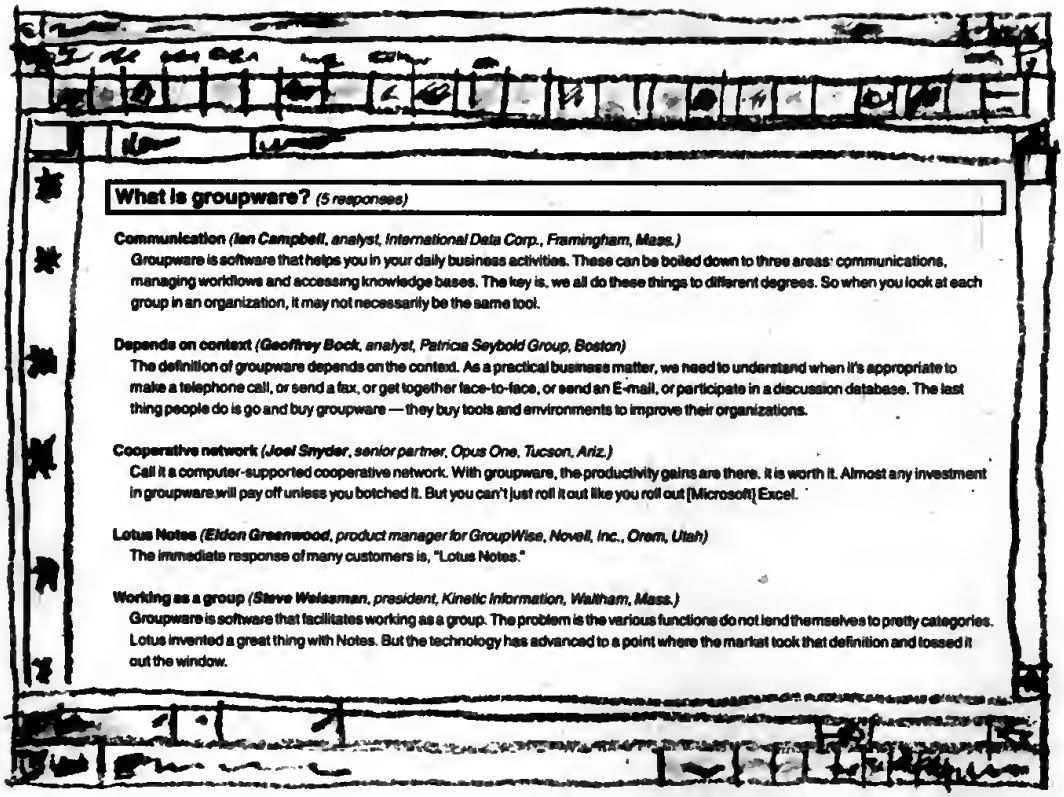


Discussion database

By Tim Ouellette

You could say the first groupware was fire. After all, it allowed people to gather, discuss common concerns and work together. In the computer age, technology has improved on most of these capabilities.

Lotus Development Corp.'s Notes is recognized as the first all-inclusive commercial groupware product. Beyond that, there is very little agreement about groupware. It isn't like a word pro-



What is groupware? *(5 responses)*

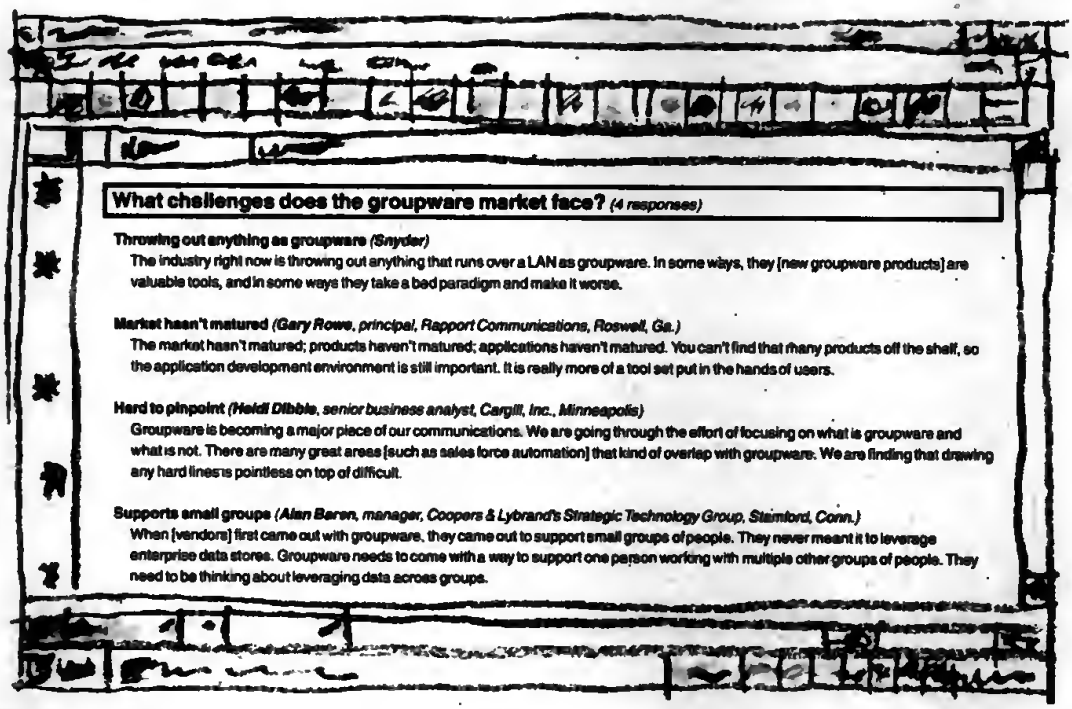
Communication ***(Ian Campbell, analyst, International Data Corp., Framingham, Mass.)***
Groupware is software that helps you in your daily business activities. These can be boiled down to three areas: communications, managing workflows and accessing knowledge bases. The key is, we all do these things to different degrees. So when you look at each group in an organization, it may not necessarily be the same tool.

Depends on context ***(Geoffrey Bock, analyst, Patricia Seybold Group, Boston)***
The definition of groupware depends on the context. As a practical business matter, we need to understand when it's appropriate to make a telephone call, or send a fax, or get together face-to-face, or send an E-mail, or participate in a discussion database. The last thing people do is go and buy groupware — they buy tools and environments to improve their organizations.

Cooperative network ***(Joel Snyder, senior partner, Opus One, Tucson, Ariz.)***
Call it a computer-supported cooperative network. With groupware, the productivity gains are there. It is worth it. Almost any investment in groupware will pay off unless you botched it. But you can't just roll it out like you roll out [Microsoft] Excel.

Lotus Notes ***(Eldon Greenwood, product manager for GroupWise, Novell, Inc., Orem, Utah)***
The immediate response of many customers is, "Lotus Notes."

Working as a group ***(Steve Weissman, president, Kinetic Information, Waltham, Mass.)***
Groupware is software that facilitates working as a group. The problem is the various functions do not lend themselves to pretty categories. Lotus invented a great thing with Notes. But the technology has advanced to a point where the market took that definition and tossed it out the window.



What challenges does the groupware market face? *(4 responses)*

Throwing out anything as groupware ***(Snyder)***
The industry right now is throwing out anything that runs over a LAN as groupware. In some ways, they [new groupware products] are valuable tools, and in some ways they take a bad paradigm and make it worse.

Market hasn't matured ***(Gary Rowe, principal, Rapport Communications, Roswell, Ga.)***
The market hasn't matured; products haven't matured; applications haven't matured. You can't find that many products off the shelf, so the application development environment is still important. It is really more of a tool set put in the hands of users.

Hard to pinpoint ***(Heidi Dibble, senior business analyst, Cargill, Inc., Minneapolis)***
Groupware is becoming a major piece of our communications. We are going through the effort of focusing on what is groupware and what is not. There are many great areas [such as sales force automation] that kind of overlap with groupware. We are finding that drawing any hard lines is pointless on top of difficult.

Supports small groups ***(Alan Baren, manager, Coopers & Lybrand's Strategic Technology Group, Stamford, Conn.)***
When [vendors] first came out with groupware, they came out to support small groups of people. They never meant it to leverage enterprise data stores. Groupware needs to come with a way to support one person working with multiple other groups of people. They need to be thinking about leveraging data across groups.

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(a) Solaris (e) Mac OS
(b) Netware (f) Windows NT
(c) OS/2 (g) Windows
(d) Unix (h) NeXTstep

App. Dev. Products ❑ Yes ❑ No
Networking Products ❑ Yes ❑ No

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F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
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D. 1,000 – 4,999	❑	❑
E. 500 – 999	❑	❑
F. 100 – 499	❑	❑
G. 50 – 99	❑	❑
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How do you get people to use groupware? *(4 responses)*

Human factor *(Mark Mills, volunteer, Dallas Computer Literacy Program)*
The human factor is the most important part of a groupware training program, but it is not discussed much. The definition of groupware should be broadened to include telephone conversations and computer-mediated conversations. There seems to be a tendency to do it all with computers.

Cultural impact *(Greg Lobdell, Exchange product manager, Microsoft Corp.)*
The challenge with groupware training is that the cultural impact gets down to the heart of a business. Users need an incentive to share information. It goes all the way down to the compensation model, for example, with salespeople. There are ramifications far outside the IS group, as well.

Good search tool *(Campbell)*
The best thing that will help people share information is a good searching tool. People are more likely to add knowledge because they feel that they can gather that knowledge back. Teach people how to find data first before forcing them to put the data in.

Show them where *(Dibble)*
We are getting away from a buns-on-the-seat approach to groupware training. We will teach people how to work together and show them where they can find specific information and where they can publish specific information. Even if you have the technology and infrastructure in place, training is the difference between gaining much or losing much from your groupware investment.

What will the Internet do to groupware? *(3 responses)*

Different kinds of interactions *(Bock)*
With the Internet, we can send E-mail to anyone in the world. We can begin to do different kinds of groupware interaction across borders.

Concentrate on core technology *(Snyder)*
World Wide Web technology lets you concentrate on the core technology of your product.

Large knowledge base *(Campbell)*
What the Internet does for groupware is provide a very large knowledge base for the user. On the intranet level, groupware on top of intranets broadens the ability to deploy groupware in the company. Let people use browsers to interact with it.

Where does groupware go from here? *(3 responses)*

Operating system *(Bock)*
The core, vanilla-flavored groupware interaction technologies will wind up in the operating system. What I expect to see in the next year or two are smart time-management environments that go beyond current calendaring and personal information manager software.

Modular *(Weissman)*
In the future, you will see more modular software. The big winners will be savvy [value-added resellers] that can put it all together for users.

Web browsers *(Dibble)*
We are developing a strategy [using Web and Notes technology] that is open and flexible. When other groupware tools become available, we can snap them in and out. Web browsers will be our lowest common denominator for groupware.

cessor; it doesn't have strictly defined features and capabilities. Different people identify different features — discussion databases, whiteboards, document conferencing, document management, workflow, electronic mail — as groupware.

Because there isn't a specific definition of groupware, what follows is a discussion database of users, analysts and vendors who are considering where groupware is now, how it is best used and where it is going.

Ouellette is *Computerworld's* senior writer, groupware and E-mail.

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Steaming brew

Demand for Java skills is hotter than ever. It's easy to learn, and it's heating up the competition.

By Candee Wilde

You're a programmer skilled in C and C++. You've mastered application development tools such as PowerBuilder and Visual Basic. Now you're ready to take the next step in your career development. Your best bet, many information systems recruiters and job hunters say, is Java.

Companies are increasingly using the Internet as a front-end tool to tie in to their internal systems. As a result, they are looking for IS professionals who combine traditional IS skills and Internet skills, says Richard Wonder, president of Richard Wonder & Associates, Inc. in New York.

But despite rising demand, competition for the available jobs is also increasing. The following are experiences of some early Java pros:

Java to go

DAVID CHEN
Contractor programmer
Major telecommunications firm

Chen acquired Java skills by downloading development tools from the Internet and practicing at home. He is working as a contractor but is looking for a permanent position. He has experience with Java, Visual Basic, Multimedia ToolBook and Visual C++, as well as Access and Perl programming for World Wide Web page development.

In learning Java, Chen says, "The tutorial from www.javasoft.com has been quite useful, plus the Java Development Toolkit, which has some examples. Learning from other people's programs is the most helpful experience."

Also useful is Gamelan, The Directory and Registry of Java Resources home page on the Web, he says.

Java on the side

JOHN SHIPLE
Interface designer
Construct Internet Design

Even though he isn't really job hunting, Shiple says potential employers have expressed an interest in his Java skills after he posted his name on several message boards "on a lark."

"I read the spec and everything on [Sun Microsystems, Inc.'s] site. Then I practiced a little bit. Voila."

To learn Java, Shiple says, "I read the spec and everything on [Sun Microsystems, Inc.'s] site. Then I practiced a little bit. Voila."

Employers looking for Java programmers prefer people who have other Web-based technical skills — people who have been webmasters or systems administrators, Shiple says. He recommends having knowledge of Common Gateway Interface programming and database skills.

Java junkies

JOHN R. CRISWICK
President
The Internet Conveyor Ltd.

As the head of a small consulting and Internet content developer in Ottawa (www.conveyor.com), Criswick says local telecommunications firms are "currently in a hiring spree for Java developers. There are a few headhunters on the prowl, as well."

"We started the group because we wanted to have a forum for networking with other Java professionals in the region."

Criswick has a bachelor's degree in computer engineering and a master's degree in space physics. He has worked on Internet projects for about four years. And he cofounded the Ottawa Java Users Group (on the Web at ottawa.jug.org) in February.

"We started the group because we wanted to have a forum for networking with other Java professionals in the region," he says.

Brewing their own

PETER TITTLER
Vice president of networks and technology
Avis Car Rental, Garden City, N.J.

Tittler says the car rental giant is training a handful of in-house programmers to use Java. Avis IS managers believe Java will ultimately be significant, but Tittler says the company has no plans to hire new programmers to meet the company's needs.

"Assuming our requirements don't outstrip our programming capabilities, we'll do it in-house," he says.

Overall, Tittler says, publicity about Java seems to be moving faster than real-life developments.

Although Java offers exciting possibilities, he says, people tend to forget "that it's only been around a few months. We don't have a suite of applications. If you go out on the Internet, great Java applications are very minimal." ■

Wilde is a freelance writer in Easton, Conn.

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PROGRAMMER ANALYST (9 openings) (Ref. 9011017) Consult with clients to ascertain & define their business requirements or problem areas & utilize technical expertise to provide solutions to clients' needs; analyze, design, develop & implement computer software for clients' EDP systems; analyze design program, implement, prototype, enhance, maintain production support, administrate, benchmarking & performance tuning of ORACLE, UNIX & C/C++ based applications relevant to diverse business functional areas & industry segments. ORACLE software installation and support, database administration, Schema & Data Conversion. Using E-R, CASE*DICTIONARY, PRO*C, C, C++, OCI, SQL*PLUS, SQL*DBA, exp, exp, SQL*LOADER, SQL*NET, TCP/IP, UNIX Shell Scripts, UNIX System Calls & UNIX Tools for development & Monitoring - make, sccs, rcs, dbx, sed, awk, tcsetat, vmstat, Windows, X Windows & TCP/IP environments. Reqs Bach in Comp Sci, Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis, Mathematics or its equiv & 2 yrs exp in job offered or 2 yrs. related exp as a Programmer/Programmer Analyst, Systems Analyst, Sr. Systems Analyst, Asst. Consultant or Consultant. Will accept 3 yrs. college ed plus 3 yrs. exp in job offered or related occup in lieu of req'd ed & exp. The exp in the job offered or related occup must have included 6 mos of ORACLE s/w installation & support, database administration and using each of the following: SQL*Plus, CASE*Dictionary, SQL*DBA, PRO*C, OCI, TCP/IP and UNIX systems; calls $46,000/yr, 40 hrs/wk, 8a-5p, M-F. Send resume with Ref. No. to Mr. Richard Hanson, Manager, Office of Employment Security, 1122 Western Avenue, Pittsburgh, PA 15233.

SOFTWARE ENGINEER Analyze, design and develop cooperating network software systems using network protocols, including TCP/IP, UDP/IP and API's including, but not limited to, Berkeley Socket interface on AIX or other UNIX systems and MS-DOS operating systems. Analyze, design, develop and test network protocol stacks on MS-DOS operating systems using "C" language. Analyze, design and develop Distributed Object-Oriented software systems/applications using both Non-CORBA and CORBA (ORB's) compliant Distributed Object-Oriented Development Environments on AIX, or other UNIX operating systems, using C, C++, CORBA IDL and other languages where appropriate. Analyze, design, and develop Distributed Object-Oriented Application Frameworks and Libraries using C, C++, CORBA IDL and Non-CORBA and CORBA (ORB's) compliant Distributed Object-Oriented Development Environments on AIX, or other UNIX operating systems. Analyze, design and develop Security Services API's for developing secure software systems (using Kerberos) on AIX, or other UNIX operating systems. Analyze, design and develop software applications using client-server programming architecture on MS-DOS and AIX (or other UNIX operating systems). Analyze, design, and develop multi-threaded and multi-tasking software systems on AIX/UNIX operating systems. Debug Object-Oriented applications/software developed using C, C++. Master of Science degree required in Computer Science or Software Engineering plus 1 year of experience in the job duties described above. Salary $46,000/year for a 40 hour work week. Apply at the Texas Employment Commission, Fort Worth, Texas, or send resume to the Texas Employment Commission, 1117 Trinity, Room 424T, Austin, Texas 78701, Job TX7865804. An equal opportunity employer.

PROGRAMMER ANALYST (6 openings) (Ref. 7010846) Install & administer production database using SQL DBA to client/server networks; perform requirement analysis, data modeling, capacity planning, cost estimation & scheduling for new databases; build data flow and entity-relationship diagrams and design normalized relational tables using Excelerator CASE Dictionary, CASE Methods and CASE Generator in ORACLE 7; use SQL Forms, SQL Report-Writer to generate screens & reports; program in PL/SQL, SQL Plus, C & UNIX for database monitoring, performance tuning & query optimization; code in Motorola M68030 assembly language and Unisys mainframes; project management, function point analysis, system integration, training, presentation & documentation; use MS Word, EXCEL & PowerPoint; customize & install check processing (ICPS, IPS, DFS) and financial applications. Reqs Bachelor's degree in Computer Science, Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or its equivalent in ed. & exp. Will accept 3 yrs of college ed. plus 3 yrs. exp. in job offered or in a related occup. in lieu of the required ed. & exp.; 2 yrs. exp. in job offered or 2 yrs. exp. in related occup. as a Systems Analyst, Programmer Analyst or Consultant. The exp. in the job offered or related occup. must have included: 6 mos. of requirements analysis, data modeling and using M68030 assembly language, UNIX, SQL Forms, SQL ReportWriter, SQL Plus, ORACLE7, Microsoft Word, EXCEL and CASE methods. $72,000/yr, 8a-5p, M-F. Send resume with Ref. No. to Ms. Charlene Copley, Manager, 2100 Ninth Avenue, PO Box 1150, Beaver Falls, PA 15010.

EXCEPTIONAL EXECUTIVES

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- **Director level position for Operations:** Will manage an in-house, integrated platform set that includes SUN, DEC Alpha, NEXT, Tandem, IBM mainframes and more, and Intel. Must be technically strong in UNIX and SUN Solaris and have at least 5 years of client server experience. The challenge is to standardize and automate the process. Will manage a staff of over 50 people, including Directors, Managers and top technical talent. Total comp in the $150k range.
- **Director level position for Networking** for the multi-platform environment above. Protocols include: ATM, FDDI, TCP/IP, IPX, Token Ring, and Ethernet. The key is to have an excellent perspective on day-to-day operations, implementation and emerging network technologies. Will manage a staff of over 20 people and be both technology and business sensitive. Total comp in the $150k range.
- **Senior Manager of Technical Operations** will direct the efforts of three groups: a 24x7 UNIX/SUN OS and Solaris Data Center, a Level 2 PC & Windows, phone-in Help Desk and a telephony (DSO-DS3) inbound and Outbound communications capability. The key challenge is to manage a staff of 15-20 to take individual responsibility, resulting in a smoothly running document store and forward service. Total comp to the low $80's.

For immediate consideration, please send or FAX your resume to:

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Software Engineering Manager (Product Certification Testing). Direct team of software engineers engaged in performing product testing for Product Certification and Testing department, incl. hands on acceptance testing for all Research and Development, CPE & integrated products, host software, host software utilities & print systems. Responsible for development of integrated product test plans according to product requirements & engineering product specifications using "black box" test methods. Oversee development of automated tools to be used in the certification & overall quality assessment of products; interprets records & archives test data & results, & maintains Product Certification Testing fileserver structures & test files, & related database programs. Continuously updates Kanji test suite (in Kanji (Japanese) character set). Req. MS in Computer Science or Electrical/Electronic Engineering. Degree program must have included courses or research in algorithms, theory of automata, computer architecture, database theory, computer language design, artificial intelligence, software engineering principles (for "black box" testing principles), compiler construction, software testing, & programming in a UNIX environment & in C (any). Must possess thorough knowledge of Kanji (Japanese) character set. EOE. 40 hrs/wk, 8:00 a.m. to 5:00 p.m. Salary: $44,000/yr. Send resume (no calls) to: Human Resources, QMS Inc., 1 Magnum Pass, Mobile, Alabama 36618.

COMPUTER SCIENTIST needed by a central Kentucky Engineering & Environmental Consulting Firm to perform in-house computer network administration including installation, maintenance & system administration of LAN. Run Phoenics software & programs & hone its with Fortran & PIL to develop turbulent, 3D BFC models for computational fluid dynamics. Travel to Mason, OH office once a week, for one day to perform network administration & travels throughout continental U.S. to company's offices twice a year for a two week period to perform special projects. Must have a Master's degree in Computer Science. Must have 9 months exp in job offered or 6 months exp programming Phoenics with Fortran & PIL to develop turbulent, 3D BFC models & installing, maintaining & performing systems administration of LAN. (Exp may be gained before, during or after degree & may be gained concurrently). Work Schedule: 40 hrs/wk, 8am-5pm, Mon-Fri. Salary $42,200.00/yr. Applicants must be authorized to work permanently in the U.S. EQUAL OPPORTUNITY EMPLOYMENT. Send 2 resumes & cover letter to Mary Rogers, JOB036553, Department for Employment Services, 275 E. Main Street, 2W, Frankfort, KY 40621.

Programmer Analyst (Job Order No. 90571127) - Plan, develop, test & document comp programs; apply knowledge of programming techniques & comp systems; evaluate user request for new or modified programs, determine feasibility, cost & time required, compatibility with current sys & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps required to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Design, development, analysis s/w requirement, program & database design using C, C++, Visual C++, MFC, Watcom SQL, SUN Workstation, Oracle, Visual Basic, GUI design & Access. Reqs Bach. in Comp. Sci., Computer Information Systems, Computer, Electrical or Electronic Engineering, Systems Analysis, Mathematics or its equiv. in ed. & exp. 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer Analyst, Programmer Analyst, System Analyst, Software Engineer, Consultant or Associate Engineer. Will accept 3 yrs. college ed. plus 3 yrs. exp. in job offered or in a related occup. in lieu of req'd ed. & exp. The exp. in the job offered or related occup. must have included 6 mos. using each of the following: Visual C++, MFC, Watcom SQL & SUN Workstation. $46,000/yr, 40 hrs/wk, 8a-5p, M-F. Send resume with Job Order No. to Mrs. Margaret Fallaca, Manager, Office of Employment Security, 3 Kensington Square, New Kensington, PA 15068.

DBA'S AND PROGRAMMER ANALYST

Big "B" Drugs, a major drug retail chain in the southeast, is currently seeking IS professionals with experience using CICS and DB/2 in UNIX and/or MVS environment. Qualified candidates will have a minimum of 3 years experience. Degree preferred but not required.

The DBA candidates must have experience in the logical design of a relational data base. Experience in DB/2, DB2/6000 and DB2/2 in a cross-platform environment using ORDA/DDCS preferred.

The PROGRAMMER ANALYST must have experience in both batch and on-line programming applications using a relational data base.

Interested candidates should forward their resume and salary history to:

Jim Barton
Director of Application Development
Big B Inc.
P.O. Box 10168
Birmingham, AL 35202

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Key Services Corporation, a wholly-owned subsidiary of KeyCorp, has openings in our Cleveland location for Systems Consultants to become a member of our alternative banking systems team. You will provide consulting services in the system; engineering and/or systems analysis functions. Excellent technical skills in programming direct talk/6000 platforms utilizing the GUI interface application builder and "C" language programming skills.

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Key Services Corporation
Human Resources/AD
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Mailcode: OH-01-01-0102
Cleveland, OH 44115

E-Mail: KSCRecruit@KeyCorp.e-mail.com
(Resumes in ASCII format only, no file attachments, please.)

PROGRAMMER ANALYST (2 openings) - plan, develop, test & document comp programs, applying knowledge of programming techniques & comp systems; evaluate user request for new or modified programs, determine feasibility, cost & time req'd, compatibility with current sys & comp capabilities; consult with users to identify current operating procedures & clarify program objectives. Formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Responsibilities include process modeling, unit & integrated s/w testing, s/w design, development & using DEC VAX/VMS, PRO-IV, Prokit Workbench CASE tool, Fortran, Pascal, C & RTUs. Reqs Bach. in Comp. Sci., Systems Analysis, Comp. Information Systems, Comp. Engg., Electrical Engg., Electronic Engg., Mathematics or to equiv to ed & exp & 2 yrs. exp. to job offered or 2 yrs. related exp as a Programmer, Programmer Analyst, Sys. Analyst, Software Engr., Consultant or Systems Executive. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or to a related occup. In lieu of the req'd ed. exp. Must have exam related exp which included s/w design, development & using each of the following: DEC VAX/VMS, PRO-IV, Prokit Workbench CASE tool, Fortran, Pascal, C & RTUs. $44,800/yr. 40 hrs/wk., 8:30a-5p. M-F. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #49198. Employer Paid Ad.

Programmer Analyst (Oakbrook, IL): Degr/dvlpr/implmnt business applicn systems using RDBMS such as Oracle & Sybase & front-end tools such as PowerBuilder, C & Uniface on Unix/Novell backend server & Windows Front end machines. Analyze applicns & perf dfnase modeling using CASE tools such as Erwin & Oracle * CASE. M-F, 40hrs/wk, $s-$s, $4K/yr. Reqs: BS-Comp Sci or Comp Eng, 2yr exp in job offd. Must be willing to travel to client sites for short durations. Must have proof of legal authority to work permanently in U.S. Send resumes to Illinois Department of Employment Security, 401 South State Street, 3 South, Chicago, IL 60605. Attn: Len Bekas. Refr: V-IL-15581-B. An employer Paid Ad. No calls. Send 2 copies of both resume & cover letter.

VICE PRESIDENT, South Central Area Consulting. Provide management for information systems consulting group of 100 employees, to provide management consulting and information systems implementation consulting in Texas, Missouri, Oklahoma, Louisiana, Kansas, and Arkansas, to improve business operations and enable the growth of client companies. Expand the consulting group from 100 to 300 employees. Implement consulting practice management infrastructure commensurate with the size and complexity of the business. Hire administrative personnel, open additional offices, and set up business processes and systems to manage the practice. Provide business and technical consulting leadership and direction to help clients expand and improve their business operations. Provide guidance and direction for the Regional Directors. Market consulting services, manage consulting and personnel issues for the group, provide planning and budgeting for the consulting practice, and direct large consulting projects. Must expand practice by almost 100% the first year. Must have Bachelor's degree in Computer Science or Engineering and eight years of Consulting Practice Management experience with a large (more than 5,000 employees) consulting firm. Must have been a Partner or Vice President with "Big Six" or similar consulting firm such as SHL, CSC, Cap Gemini, or EDS. Must be willing to travel (50%) and work 70-hour weeks. $23,267/mo. Job/Interview Irving, TX. Apply at Texas Employment Commission, Dallas, Texas, or send resume to Texas Employment Commission, TEC Building, Austin, Texas 78778. JO# TX7868120. Ad Paid by an Equal Opportunity Employer.

PROGRAMMER ANALYST (2 openings) - plan, develop, and document comp programs, applying knowledge of programming techniques & comp systems; evaluate user request for new or modified programs, determine feasibility, cost & time req'd, compatibility with current sys & comp capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps required to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Responsibilities include dataflow design; database design; module action; technical support; meeting with users to gather requirements; & using IBM ES/9000, DB2, CICS, CSP, REXX, JES2, JCL, VSAM, QMF, SDF-II, V6 COBOL II, COBTEST, FILE-AID, MVS/ESA, ADW case tools, IDMS database, ADSM/S, XDB, MF COBOL, SPF2, OS/2 & DCF documentation package. Reqs. Bach. in Comp Sci., Systems Analysis, Computer Information Systems, Computer Engineering, Electrical Engineering, Electronic Engineering, Mathematics or to equiv. In ed & exp. & 3 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Systems Analyst, Software Engineer, Consultant or Programmer Analyst Trainee. Will accept E yrs. of college ed. plus 8 yrs. exp. in the job offered or in a related occup. in lieu of the req'd ed. & exp. & max of the exp. in the job offered or related occup. must include using each of the following: IBM ES/9000, MVS/ESA, CICS, V6 COBOL II, DB2, JCL, REXX & QMF. $42,848.96/yr. 40 hrs/wk. M-F, 8:00a-5p. Two Copies of resume to: Mike Brooks-ALC, P.O. Box 7972, Madison, WI 53707-7972. Reference #680198.

Computerworld's 1995-96 Salary Survey is Now Available on Disk!

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Software Engineer. Will create and develop appropriate software to be used for purposes of automated machine processes including specifications of appropriate software documentation. Will create Graphic User Interfaces to allow process control in conjunction with an Intelligent Front End System software package for creation of interface between machine and fiber placement and application of machine functions. Will create appropriate data calculations and massive calculations functions to generate appropriate code to anylyze 3-dimensional objects to insure integrity and accuracy of fiber placement functions of automated machines. Will perform work in C and SIL on an IBM/RS6000 and HP/Unix workstation to convert project data to generate numerical control files using Offline Programming System. Requires M.S. or completion of all course work requirements for M.S. degree in Software Engineering or Electrical Engineering. Also requires six months experience in the job to be performed or six months experience as an Assistant Engineer. If experience in related field, entire experience must include the design and implementation of a real time control system using digital signal processing technology including system implementation for electrical power transfers. Education to include completion of one course in each of the following: Advanced Engineering Math; Digital Image Processing; Parallel and Distributed Processing; Neural Networks; and, Object-Oriented Design. Education to include completion of one project in which the individual designed and implemented and neural network system to perform image processing and pattern recognition in a UNIX/C environment. Education to include completion of one project in which the individual designed and implemented a Graphic User Interface for a data acquisition database using C++. Hours: 8:00 a.m. - 5:00 p.m. 40 hours per week. $38,570.00 per year salary. Must have proof of legal authority to work permanently in the U.S. Please send resume to Illinois Department of Employment Security, 401 South State Street, 7 South, Chicago, Illinois 60605. Attention: Brenda Kelly. Reference #VI-IL 14675-K. An Employer Paid Ad. No Calls - Send 2 copies of both resume and cover letter.

PROGRAMMER ANALYST (2 openings) - plan, develop, and document comp programs, applying knowledge of programming techniques & comp systems; evaluate user request for new or modified programs, determine feasibility, cost & time req'd, compatibility with current sys & comp capabilities; consult with user to identify current operating procedures & clarify program objectives. Formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Analyzes design, develop, & implement large RDBMS sys. including user requirement study, feasibility & technical analysis, logical & physical data modeling, current sys. data conversion sys. design, development, testing, implementation & technical support using: U6000, UNIX, INFORMIX-4GL, INFORMIX ESQL/C, MAKE, VI EDITOR, SHELL SCRIPTS, IEF CASE TOOL, IBM ES/9000, MVS/ESA, COBOL, CICS, VSAM, JCL, TSO/ISPF, MS WINDOWS, MS WORD & MS ACCESS. Reqs. Bach. in Comp. Sci., Systems Analysis, Comp. Information Systems, Computer Engg., Electrical Engg., Electronic Engg., Electrical/Electronic Engg., Mathematics or to equiv. In ed. & exp. & E yrs. exp. to job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Sys. Analyst, Comp. Consultant, Software Engr., Graduate Engineer Trainee or Consultant. Will accept 3 yrs. of college ed. plus 3 yrs. exp. to the job offered or in a related occup. in lieu of the req'd ed. & exp. Must have some related exp. in which included using each of the following: IBM ES/9000, MVS/ESA, UNIX, TSO/ISPF, VSAM, JCL & INFORMIX-4GL. $48,000/yr. 40 hrs/wk., 8:30a-5p. M-F. Send resume of 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #49198. Employer Paid Ad.

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APPLICATION DEVELOPMENT
Requires experience with Windows-based, client/server development using ROBMS, GUI development tools, PowerBuilder, C, C++ and Microsoft Office toolkit. Positions are also available for candidates with COBOL experience in a mainframe environment.

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DATA WAREHOUSE DESIGN
Requires experience with relational database design, relational theory, SQL, data modeling techniques, CASE tools, and decision support skills.

OBJECT-ORIENTED PROFESSIONALS
Requires experience in object technology including methodology, analysis and design, Smalltalk application development, GUI design, class library design and distributed systems.

TELECOMMUNICATIONS ENGINEERS
Minimum of 6 years experience in a network environment using Token Ring and/or Ethernet topology. Experience with analysis, design, implementation of large scale networks including: IPX/SPX, SNA, TCP/IP, Novell Network, and Windows NT Server, etc.

PERFORMANCE MANAGEMENT
Manage performance, tune and plan for a CICS, COBOL application online/batch cycle; knowledge of SAS. Strobe performance analysis tools; MVS, VSAM, JCL, COBOL/COBOL II, CICS.

TECHNICAL SUPPORT SOFTWARE PROGRAMMERS
Responsible for OEM vendor product installation and CICS support functions. Responsible for migration, configuration, maintenance and support in an MVS 5.1 Sysplex environment utilizing CICS 4.1 PTS architecture. Knowledge of SPF and JCL is required. Minimum of 3 years experience is desirable.

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Due to rapid growth, we are currently accepting resumes/ applications for several positions presently vacant. Several Programmer/Programmer Analysts, and Systems Analysts, all positions are located at our Columbia, SC office.

Information Systems Network Engineer: Work experience required of at least 7 + years in one or more of the following: OS/2, TCP/IP, UNIX, Windows 95, Windows NT, Client Server programming, SNA, and Internet Facilities. Experience with Cisco Routers, as well as network management in a Token Ring environment and an in depth knowledge of PC's is required. PC programming a major plus.

Programmer Analyst: Successful candidate must have the following skills; mainframe cobol/cobol II, GUI and also the following Client Server technology knowledge of and/or experience with client soft / client builder, screen scraper, and PC oriented. Must know and understand CICS.

Programmer Analyst: Successful candidate must have solid cobol/cobol II, JCL, Easytrieve/Easytrieve Plus and VSAM skills sets. College degree preferred, or equivalent work experience. Must know and understand the mainframe. Knowledge of IMS or DB2 preferred. Other programming languages a plus.

Programmer Analyst: Successful candidate must have solid cobol/cobol II, JCL, and ITS experience.

Systems Analyst: Must have at least four years experience in programming or systems analysis. Must include a minimum of two years programming experience in cobol/cobol II in an OS/MVS environment. IMS or DB2 a plus.

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Programmer. Programs, tests, codes, and debugs network system software to insure proper administration in a multi-network environment including LANs, WANs, and wireless internet connections. Network protocols will be based on multiple system network software including AppleTalk, Ethernet, Fiber Optics, and laser based systems. Programs and designs operating systems integration measures and possibly to computers operating on a multi-system environment including SUN workstations (in a DEC or IBM environment) MAC personnel computers, and AIX system used to compatibilize with IBM midrange computers and development of appropriate interface in IBM graphic machines installed as an IBM system Uses UNIX TCP/IP to support various interfaces within such multi-system, multi-platform environment to insure programming compatibility. Requires Bachelor's degree in Computer Science Also requires one year experience in the job to be performed or one year experience as a Programmer & experience in related field, entire experience must be in the programming of LANs and WANS for network administration with six months of the related experience to include the installation of IRIX graphics in a LAN and WAN environment and six months of the related experience to include the development and implementation of SUN workstation and AIX on an IBM environment. Hours: 8:00 a.m. - 5:00 p.m. 40 hours per week to $36,000 per year salary. Must have proof of legal authority to work permanently in the United States. Please send resume to: George Yates, Director The University of Chicago The Division of Social Sciences, 1155 East 60th Street, Chicago, Illinois 60637, No Calls.

PROGRAMMER ANALYST - plan, develop, test & document comp. programs, apply knowledge of programming techniques & comp. systems; develop user request for new or modified programs; determine feasibility, cost & time req'd, compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Duties include developing & implementing financial systems & using ORACLE FINANCIALS, SEQUENT systems, UNIX & VAX Reqs Bach. in Comp Sci., Systems Analysis, Comp. Information Systems, Computer &ngg., Electrical Engg, Electronic Engg., Mathematics or its equiv. in ed & exp. & 2 yrs. exp in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Sys. Analyst, Software Engr. Consultant, Financial Systems Manager or Finance Information Services Manager Will accept 3 yrs. of college as plus 3 yrs. exp. in the job offered or in a related occupt. in lieu of the reqd ed. & exp. The 3 yrs. related exp. which included developing & implementing financial systems & using ORACLE FINANCIALS, SEQUENT systems, UNIX & VAX $70,000/yr. 40 hrs/wk., 8a-5p, M-F. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #58486 Employer Paid Ad.

PROGRAMMER ANALYST (2 openings) - plan, develop, test & document comp. programs, applying knowledge of programming techniques & comp. systems; evaluate user request for new or modified programs; determine feasibility, cost & time req'd, compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Duties include developing & implementing financial systems & using ORACLE FINANCIALS, SEQUENT systems, UNIX & VAX Reqs Bach. in Comp Sci., Systems Analysis, Comp. Information Systems, Computer &ngg., Electrical Engg, Electronic Engg., Mathematics or its equiv. in ed & exp. & 2 yrs. exp in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Sys. Analyst, Software Engr., Consultant, Sr. Officer or Programmer Assistant Will accept 3 yrs. of college ed. plus 3 yrs exp. in the job offered or in a related occupt. in lieu of the reqd ed. & exp. Must have some related exp. which included development of programs & using each of the following: BS 2000, MVS, CICS, COBOL & DB2 $42,940/yr. 40 hrs/wk., 8:30a-5p, M-F Send resume to 7310 Woodward Ave Rm 415, Detroit, MI 48202 & include Ref #52966 Employer Paid Ad

Database Design Analyst: Creates, develops, designs, and modifies relational databases in either Oracle or Sybase relational database software systems using C, C++ and UNIX Shell in conjunction with SQL programming including use of object-oriented design methodology. Creates and develops appropriate database modules and database system to be established and implemented in a LAN and WAN Novell based network system using TCP/IP protocol as to which are installed as a RS/6000 system, for coordination of all data retrieval and access. Performs relational database design and analysis to insure data retrieval from various modules and insures customization of presentation in a client/server environment system using SQL*FORM, SQL*PLUS, SQL*MENU, SQL*REPORTWRITER and SQL*PROC tools. Requires MS or completion of coursework requirements for MS. Also requires two years experience in the job to be performed. Education to include completion of a project in which the individual performed manipulation and update of databases using C and UNIX and SQL server in a RS/6000 Hours: 9:00 a.m. - 5:00 p.m. 40 hours per week $60,000 per year salary Must have proof of legal authority to work permanently in the United States Please send resume to Kent Feiler, President, Communications Programming Inc., 7118 North Avenue, Suite 300, Oak Park, Illinois 60302 No Calls.

Software Consultant. Provide tech & funct. leadership in re-engineering of business practices. Design, dev & implement custom global mfg. (MRP, WIP, BOM) & dist. apps. (Order Entry, Inventory & General Ledger) using mfg & dist. apps. s/w based on rel. 4x, SQL, 4GLs, C programming & CASE. Conduct detailed business & operational analysis, & translate business reqs. into detailed designs & implement. Design & imp. global central db's to support world-wide data mging & tracking. Must have BSCS or equiv., 2 yrs. exp. in job offered or 2 yrs. exp. in related job (such as programmer/analyst or s/w engineer) involving rel. & distributed db s/w dev for mfg. & distribution applications in a GUInet environment. 40 hrs./wk. $41,600/yr. Job location: Houston, TX. Apply at the Texas Employment Commission, Houston, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. JO# TX7803298. Ad Paid by an Equal Opportunity Employer.

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Software Engineer WII design and develop control software and control software systems using a Motorola 68334, 32-bit microprocessor to develop micro-controllers and embedded software for use in electrical control systems of truck engines. Will use principles of control theory in conjunction with digital signal processing to generate transfer functions required for electronic control systems using C and Assembly languages. Will use C language to implement control algorithms for electronic truck engine systems and modify and convert software from existing Assembly language to Motorola 68334 software which is written in C. Responsible for completion of all coursework requirements for Master's degree in Software Engineering or Electrical Engineering. Education to include completion of a project in which the individual applied control theories in conjunction with digital signal processing to generate transfer functions required for electronic control systems using C and Assembly languages. Will use C language to implement control algorithms for electronic truck engine systems and modify and convert software from existing Assembly language to Motorola 68334 software which is written in C. Responsible for completion of all coursework requirements for Master's degree in Software Engineering or Electrical Engineering. Education to include completion of a project in which the individual applied control theories in conjunction with digital signal processing to generate transfer functions required for electronic control systems using C and Assembly languages. Hours: 8:00a.m. - 5:00p.m. 40 hours per week at $41,600.00 per year salary. Job location - Peoria, Illinois. Must have proof of legal authority to work permanently in the U.S. Please send resume to: Illinois Department to Employment Security, 401 South State Street -3 South, Chicago, Illinois. Attention: Joan Sylestad, Reference #V-IL 16125-S. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

Migration Specialist (Downers Grove, IL) Manage migration projects by overseeing, planning, designing & implementing migrations of systems from WANG VS to PC LAN &/or UNIX environment with clients regarding technical issues involving PACE & COBOL running on WANG VS, ORACLE & COBOL languages running on UNIX. Assist customers in linkages of PC applications to Data Base applications languages in UNIX, PACE, WANG VS, COBOL, & in documentation of applications & linkages. 2 yrs. exp. in systems design & analysis in WANG VS & BS nothing envt using WANG VS to UNIX communications & PACE, COBOL, BASIC & WANG. Procedure languages & documenting applications. 1 yr. exp. in UNIX (IBM AIX or HP UX), Oracle & MS Windows. Rapid linking 4th generation & COBOL applications in UNIX envt. 1 yr. exp. in VS PC 928, LOTUS 123, dBASE, Clipper, Oracle SQL* forms, SQL Loader Pro*COBOL, Precompiler SQL* Plus & PL SQL. B.S. Industrial Engineering, Computer Science, or Engineering; 2 yrs. in job off'd or in comparable computer IS position in systems Analysis & Design. 40 hrs/wk. $41,080/yr. Must have proof to legal authority to work permanently in the U.S. Send two copies or both resume & cover letter (no calls) to: Illinois Department of Employment Security 401 South State Street - 3 South Chicago, IL 60605, Attn: Brenda Kelly, Ref #V-IL 14983-K.

PROGRAMMER ANALYST - plan, develop, test & document comp. programs, applying knowledge of programming techniques & comp. systems; evaluate user request for new or modified programs; determine feasibility, cost & time req'd, compatibility with current sys. & comp. capabilities; consult with user to identify current operating procedures & clarify program objectives; formulate plan outlining steps req'd to develop program using structured analysis & design; convert project specifications, using flowcharts & diagrams into sequence of detailed instructions & logical steps for coding into language processable by comp. Design & implementation using IBM Mainframe, AS400, COBOL, RPG, debugging tools & SYNON/2e Reqs Bach. in Comp. Sci., Systems Analysis, Comp. Information Systems, Computer Engg., Electrical Engg., Electronic Engg., Mathematics or its equiv. in ed. & exp. & 2 yrs. exp. in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Sys. Analyst, Software Engr. Consultant, Systems Executive or Systems Consultant. Will accept 3 yrs. of college ed. plus 3 yrs. exp. in the job offered or in a related occupt. in lieu of the req'd ed. & exp. Some of the related exp. must have included using each of the following: IBM Mainframe, AS400, COBOL, RPG & debugging tools $58,000/yr. 40 hrs/wk., 8:30a-5p, M-F. Send resume to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 & include Ref #73586. Employer Paid Ad.

Systems Analyst. 40 hrs/wk from 9am to 5pm. Salary is $45,000/yr. Job duties to include development of commercial application systems using GUI tools as front end and relational database as the back end. Consult with clients at client-site. Operating systems and langs. C include: POWERBUILDER, SYBASE, MS WINDOWS, HP-9000 and NOVELL NETWARE. Require Bachelor's degree with Computer Science or Computer Science Engineering as major and 6 months experience in job offered or as Senior Systems Executive. Experience must include six months work with POWERBUILDER, SYBASE, MS WINDOWS, HP-9000 and NOVELL NETWARE. Must have proof of legal authority to work permanently in the U.S. Please send resumes to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, Illinois 60605. Attention: Lan Bokes, Reference #V-IL 15315-S. An Employer Paid Ad. No Calls. Send 2 copies of both resume and cover letter.

Systems Analyst (Consultant). Develop & implement operational support systems (eg, financial, mfg, & human resources) based on employer's relational database software & 4GL application development tools. Analyze clients' business info. Flow reqs. using CASE, formulate enterprise models, define environmental, health & safety reqs., & design & develop custom applications. Must have BSCS/EE or MBA & 3 yrs. exp. in job offered or in analysis & design of business systems. Experience must include CASE tools & methodology modeling techniques, RDBMS tools, operating systems (including UNIX, VMS, MS-Windows & DOS), & network protocols (including TCP/IP & Netware). Must have ability to program in C & 4GLs. $45,17/mo. Work hours: 50% domestic travel. Home office in Irving, TX. Apply to the Texas Employment Commission, Dallas, Texas, or send resume to the Texas Employment Commission, TEC Building, Austin, Texas 78778. JO# TX7858352. Ad Paid by an Equal Opportunity Employer.

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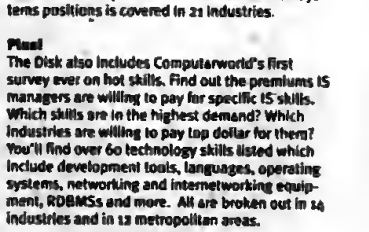

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Applications Programmer. Programs, codes, tests, debugs, and modifies application programs using C, including interfacing implementation in Visual Basic, with particular emphasis to dBASE IV and ACCESS to insure that systems and programs written properly installed on a Local Area Network and Wide Area Network. Performs appropriate programming to insure compatibility and installation of such systems and programs in Novell 3.12 and 4.1 environment as Windows and Windows NT. Requires Master's degree in Management Information Systems. Education to include completion of a project in implementation to neural networks using C, including interface implementation in Visual Basic. Education to include completion of one course in each to the following: Computer Networks, Information Systems Design and Decision Support Systems. Hours: 8:00 a.m. - 5:00 p.m., 40 hours per week at $35,815.00 per year salary. Must have proof to legal authority to work permanently in the U.S. Please send resume to Illinois Department to Employment Security, 401 South State Street - 9 South, Chicago, Illinois 60605. Attention: Ruth Dameus, Reference #V-IL 16861-R. An Employer Paid Ad. No Calls - Send 2 copies of both resume and cover letter.

PROGRAMMER/ANALYST III to analyze, design, develop, test, implement, enhance, document and maintain MAC/PAC AS/400 Distribution, Accounting, Warehouse Management System (WMS), and CYBORG Human Resources application systems in an IBM AS/400 environment using RPG-III, RPGtech OL/400, SDA, RLU, DFU, PDM, SEU OPNQRY, EXTERNAL Change Management System (THENON), Relational Database technologies, Commitment Control and Journaling under OS/400. Responsible for supporting Order Processing, Billing, Shipping, Inventory Tracking and Customer Satisfaction applications. Maintain the interfaces between MAC/PAC, WMS and CYBORG systems. Prepare functional specifications to support new system enhancements including coding, testing and debugging using EXTERNAL software tools and code optimization. Require: BS in Computer Science/Engineering/Mathematics or a closely related field and two years experience in the described job duties or in the related occupation of Systems Analyst. Salary $56,000 per year 8 am to 5 pm, M-F Send resume to Mrs. J. Glaston, Div of Employment Security, P.O. Box 336, Florissant MO 63032. Refer to Job Order # 380031

Programmer Analyst to analyze, design, develop, test, implement & maintain database & program production & industrial applications using Visual Basic (3.0 & 4.0 Ver 5), Microsoft Access 2.0, SQL Server, Oracle 7.1 & later version, C, C++ & Lotus Notes; customer support, software/hardware knowledge to solve customer's problems using Novell network; develop client/server applications; develop OLE API & image processing applications; use ODBC drivers & to connectivity; develop 16-bit & 32-bit applications; DOS, Windows, Windows 95 & UNIX; EFS Excalibur server & use TCP/IP for DOS & UNIX. Reqs. Bach. in Production Engg. or its equiv. in ed. & exp., 2 yrs.exp in job offered or 2 yrs related exp such as Project Engr. or Research Assoc. Related exp must include software design, development & structure, development of database application packages using MS Access, Auto Manager Work Flow & Archbus. & using Visual Basic 3.0, C++, Borland C & Turbo C++ (exp may be concurrent). $42,000/yr. 40 hrs/wk 8a-5p. Send resume to 7310 Woodward Ave., Room 416, Detroit, MI 48202 Ref #56296 "Employer Paid Ad"

Senior Consultant Designs, develops, and modifies software systems for Business Planning and Control System (BPCS) implementation and communication purposes. Develops entire system including customization of software and hardware in an IBM AS/400 midrange environment. Develops manufacturing software systems control software including Shop Floor Control (SFC) and Manufacturing Data Management (MDM). Uses SQL/400 and Case Tools in performances to duties. Requires Bachelor's degree in any field. Also requires four years experience in the job to be performed or four years experience as a Software Engineer or Systems Analyst. If experience in related field, entire experience must include performance to all duties and tasks as specified in job offered. Hours: 8:00 a.m. - 5:00 p.m. 40 hours per week at $63,000.00 per year salary. Must have proof of legal authority to work permanently in the United States. Please send resumes to: Kim M. Doren Recruiter, Mew Resources Corporation, 3315 Algonquin Road, Suite 500, Rolling Meadows, Illinois 60008-3251 No Calls.

PROGRAMMER/ANALYST. Develop business software and systems in UNIX and ORACLE 7.0 to diverse commercial client sites using SQL Plus 3.0, Pro*C, C and PL/SQL 2.0 languages. Write programs for barcoding to Warehouse Information System with radio frequency guns. Provide post-development support. 8:30AM to 5:30PM $40/hour (no higher rate for overtime) 40 hours/week (full time). Three years' experience as programmer/analyst, two years of that experience must include performance tuning using diagnostic tools for optimal execution of programs. Requires BS Computer Science, Physics, or Electrical Engineering. Must have permanent right to work in the United States. Send resume and cover letter to Ann Kyle Zandy, HESTAIR, 8703 Richmond Avenue, Suite 214, Houston, TX 77063.

TRUE Project Manager M.S. Engineering or Programming, min. 6 yrs. experience Duties: Solving creative problems in various areas using Theory of Inventive Problem Solving (TRIZ), teaching and coaching Associate specialists in using TRIZ for innovative problem solving, developing and delivering theoretical materials on TRIZ methodology, prototyping new TRIZ software, teaching and training materials for seminars on TRIZ. Min. 3 yrs. of experience working with TRIZ. Must read technical literature. $72,725/yr, 40 hrs/wk, 8-5pm. Employer paid ad. Send resume to 7310 Woodward Ave., Room 413, Detroit, MI 48202. Ref. No. 6699

S/W Eng: design & implement Extended Service Plan, develop GUI between FileNet Image system & IBM PC/3270 work station in Visual Basic; work in VAX/VMS, SUN UNIX system, INGRES, PARADOX, program in UNIX/C, C++ Visual Basic, FORTRAN, & INGRES ORACLE database Req. MS in computer sci or civil eng, 1 yr exp in job offered or related as s/w developer or eng, related exp include those in developing database & GUI using image processing technologies, IBM/3270, UNIX/C, C++ Visual Basic, Ingres, Oracle data* base, & 1yr in using VAX/VMS operating sys. 40hr/wk, 8-5pm, $75K/wk. Send resumes to 7310 Woodward Ave, Rm 415, Detroit, MI 48202 Ref No. 84486. Employer paid ad.

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For opportunities at JavaSoft, check out http://java.sun.com/ or fax your resume to (408) 343-1615 or email: jobs@java.sun.com, Attn: Dept. ACW0610AC/GM.

To apply for positions for our Chelmsford, MA site, please send your resume indicating job title of interest via mail, fax or email to: Sun Microsystems, Inc., 2 Omni Way, Dept. ACW0610AD/SM, Chelmsford, MA 01824; Fax (508) 442-0011; email: staffing@east.sun.com.

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- *2-3 years exp. in multi-user SMP environment*
- *Solaris 2.x, SPARCserver, TCP/IP admin and backup/recovery skills* **Code: KH**

Informix DBA
- *2-4 years exp. as Informix DBA in VLDB SMP environment*
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- *Performance tuning, logical/physical modeling, disaster recovery skills* **Code: KH**

Systems Analyst
- *4-5 years Windows (3.x) development experience coding in Visual C++ with MFC, WinSock TCP/IP API, some PowerBuilder and OS/2* **Code: PM**

Sr. Systems Analyst

Candidates should have a mix of the following skills:
- *2+ years MS SDK (Windows NT) exp. OR 4+ years Windows 3.1 Internals exp.*
- *2+ years Class Construction Design exp.*
- *2 - 4+ years C/C++ with OOA/OOD exp.*
- *Network Client Programming with TCP/IP (WinSock)* **Code: AK**

Network Administrator
- *2-3 years experience as network administrator in medium to large multi-user environment.*
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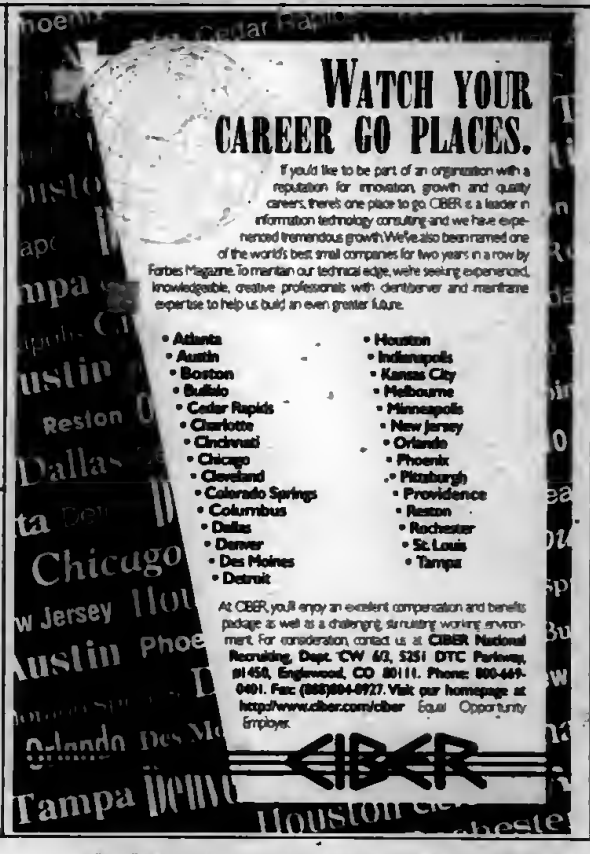

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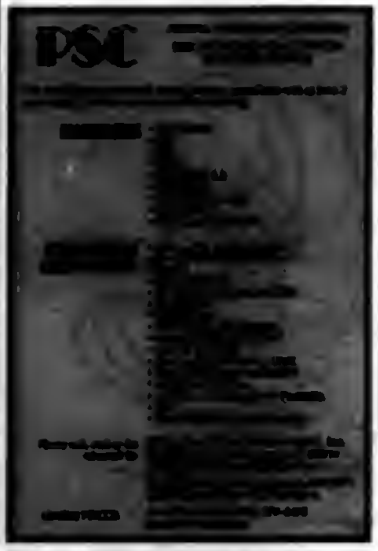

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PROGRAMMER ANALYST (5 openings) (Ref 7010927) Analyze, design, develop computer s/w application systems on Unix machines utilizing Oracle 7 CASE 5.1, COBOL, MVS using natural languages, TCP/IP, Business Objects 3.0 & massively parallel design techniques, database administration, building test data, writing program specifications, technical documentation, user documentation, & user training involve the user of Oracle 7, Oracle*CASE tools, Oracle*Forms 4.0, Business Objects 3.0, FTP, TCP/IP & MCP. Reqs Bach. in Comp. Sci., Computer Information Systems, Computer Electrical or Electronic Engineering, Systems Analysis Mathematics or its equiv 2 yrs. exp. in job offered or 3 yrs related exp as a Programmer, Programmer/Analyst, Systems Analyst, Software Engineer or Consultant. Will accept 3 yrs. college ed. plus 3 yrs exp in job offered or related occup. in lieu of req'd ed & exp. The exp. in the job offered or related occup. must have included & mos using each of the following Oracle 7, Oracle*CASE tools, Oracle*Forms 4.0, Business Objects 3.0, FTP, TCP/IP & MCP. $75,000/yr. 40 hs/wk, 8a-5p, M-F. Send resumes with Ref. No. to Mr. James McCoy, Manager, Office of Employment Security, 4206 Broad Street, Pittsburgh, PA 15208.

Engineer, Senior Software. Design & dvlp advncd user interface s/w apps. used for dev't of cmpny's Internet prod. Design & dev/p various s/w appl. for Windows NT 3.51, Windows 95 & Windows 3.1 o/s. Design & dev/p object-oriented s/w. Dev/p GUI & back-end s/w. Dev/p s/w in C++ & C using Microsoft Visual C++ compilers & s/w using MFC 3.1, OLE 2.0, and ODBC. Configure & mnge s/w apps. running on remote NT srvr. Rvw designs & prep dsgn specs of s/w apps. Req: B.S. in Comp. Sci. or to equiv. plus 4 yrs exp. in job offr or in s/w dev't. Wrk exp must hv included hands-on exp in: s/w dev't & implementation in C++ & C using Microsoft Visual C++ compilers; s/w dev't using Windows NT, Windows 95 & Windows 3.1 o/s; object-oriented design & prgmming using stndrd methdlgs; GUI prgrmming w/ Windows features incldng device cntxts, mapping modes & custm controls; s/w dev't using MFC 3.1, OLE 2.0, dragdrop, server containr apps., OCX controls & ODBC dbase access. Job site & srvr: Hillsboro, OR; min 40 hs/wk, $4,800/mo. Qual applcnts send res to: Emp. Dept., Attn: J.O. 40561205, 875 Union Street, NE Rm. 201, Salem OR 97311. Applicant must hv legl auth. to prmanently wrk in US. Comp is an Equal Opp emp & affy apprtn affirm. action prgrss.

PROGRAMMER ANALYST (5 openings) (Ref. 8011027) Perform systems analysis & development using AS400, COBOL, RPG, &YBASE & Powerbuilder on Client Server Platforms. Responsible for meeting with users to gather requirements, process flow; data flow design; data modeling; development, testing & technical support using Server platforms AS400 with COBOL/RPG, UNIX m/c with SYSASE, ORACLE & GUI. Also using tools including Powerbuilder, DBARTISAN & Lotus Notes. Reqs. Bach. in Comp. Sci., Computer Information Systems, Computer Electrical in Electronic Engineering, Systems Analysis, Mathematics or to equiv. in ed. & exp. 2 yrs. exp in job offered or 2 yrs. related exp. as a Programmer, Programmer Analyst, Assistant Systems Analyst, Systems Analyst, Systems Manager, Assistant Engineer-Purchase or Consultant. Will accept 3 yrs college ed. plus 3 yrs. exp. in job offered or related occup. in lieu of req'd ed. & exp. The exp. in the job offered or related occup. must have included & mos. of systems analysis & development & using each of the following: AS400, COBOL, RPG, SYBASE & POWERBUILDER. $55,000/yr. 40 hrs/wk. 8a-5p, M-F. Send resume with Ref. No. to Mr. Greg &chwing, Manager, Office of Employment Security, 2100 Wharton Street, Pittsburgh, PA 15203.

Software Engineer-Chicago, IL to Design algorithms for network design and optimization. Design GUI for a WAN design and optimization tool, and implement that GUI in C++ on MS Windows using a portable application framework. Test and debug code. Develop prototypes to test feasibility of design. Port applications and provide client training and support. M-F 9-5 40 hrs./wk. $42,200/annum. Require MS in Computer Science or equiv. degree and one years exp. in the job offered in one years' exp as a customer Support Engineer, Software Engineer or Software Consultant. Experience must include designing, programming and testing applications in C++, developing system prototype, porting applications and providing client training and support. Must possess expertise in design of algorithms and software design as may be shown by coursework in these subject areas. Up to 100% travel within U.S. possible. Must have proof of legal authority to work permanently in the U.S. Send two copies of both resume and cover letter to Illinois Department of Employment Security, 401 South State Street - 3 South, Chicago, IL 60605. Attention: Ruth Daniels. Reference # V-IL 14626-R. No calls. An employer paid ad.

Software Engineer (Senior) Lead, coordnat & schdule prjcts of 3 s/w dev't engn'rs rspnsble for designng, implmntng & testing major funct'nl s/w subsystms. Implmnt proprietary s/w prdcts dvlpd in C++ & assembly lang for PC h/w & ISA bus architctre. Implmnt s/w prodcts using object-orntd dsgn mthdlgs. Implmnt interpt hndlrs in DOS & technicl dscpln in BIOS. Redsgn grphics & os video & implmnt s/w prdcts using TCP/IP prtcls. Rvw & mgmt writtn schdule & docmntat'n of s/w prjcts. Dsgn & implmnt DMI s/w technlgy. Prvd tech sppt to OEM custmrs on the implmntat'n of DMI s/w & othr s/w prdcts. Cndcts/at jnt prjcts w/ othr rsrch tech. groups in a geogrphcl cross-site env. Wrk exp must hv provided hnds-on exp in: s/w dsgn & implmntat'n using BIOS & DOS intrrpt incldng interpt hndlrs; dsgn & implmntat'n of s/w applicat'ns using C++ & assembly lang for PC h/w & ISA bus architctre; dsgn & implmntat'n of s/w applicat'ns using object-orntd dsgn mthdlgs; dsgn & implmntat'n of DMI s/w; implmntat'n of video rdrct'n applic'ns; s/w dev't using TCP/IP rsverng prtcls. Req: MS in Electrcl Eng or Comp Scis (or frreign equiv) + 4 yrs in job offrd or in s/w engr or in s/w prdct dev't. Job loc: Hillsboro, OR; min 40 hs/wk; $4,783.67/mo. Qual applcnts send res to: Emp. Dept., Attn: J.O. 40561223, 875 Union Street, NE Rm. 201, Salem OR 97311. Applicnt mst hv legl auth. to prmanently wrk in US. Comp is an Eql Opp emp & affy apprtn affrmtv act'n prgrss.

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PROGRAMMER ANALYST (2 positions) 40 hrs/wk., 8am-5pm, $50,000/yr. Carry out the analysis of program specifications, program design, coding and testing of application systems under UNIX environment utilizing ORACLE, PowerBuilder and "C". Reqr. Bachelor's degr. in Computer Science or Electrical or Mechanical Engrng. and 2 yrs. exprn. in job offered or 2 yrs. exprn. in Systems Analysis &/or S/W Engineering &/or Programming &/or Computer Consulting. Reqr. work experience in developing applications under UNIX environment and with ORACLE, "C" and PowerBuilder. Employer is S/W development/consulting firm. Relocation to various client sites throughout the U.S. for periods of & mos. to 2 yrs required. "Employer paid ad". E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref #73096.

Programmer/Analyst - majority of time at client sites in Des Moines, IA, balance of time at client sites elsewhere. Analyze users' needs, evaluate applications, programs, GUIs, enhance, modify & reuse modules, write specs & code; use MS-Windows, Visual Basic, Visual C++ & either SQL Server or Sybase. Bachelors/ Comp Sci or Engg or Math + 2yrs/exp. In job offered. Exp must incl. 2yrs using MS-Windows, Visual Basic; either Visual C++ or C++; either SQL Server or Sybase or Oracle. Must be willing to travel & relocate as needed (reimb. by employer). 40hrs/wk. (9-6), $45,000/yr. OT as needed @ $23.08/hr. Must have proof of legal authority to work in the U.S. Send your resume to D.E.S. Workforce Center, 215 Keo Way, Des Moines, Iowa 50309-1727. Please refer to Job Order #IA1100514. Employer paid ad.

SENIOR PROGRAMMER ANALYST (2 positions) 40 hrs./wk., 8am-5pm, $41,600/yr. Carry out program analysis, program design, coding and testing of computer software application programs under IBM mainframe environment utilizing DB2, CICS and COBOL. Reqr. Bachelor's degr. in Computer Science, Electrical or Mechanical Engrng. and 2 yrs. exprn. in job offered or 2 yrs. exprn. in Systems Analysis &/or S/W Engineering &/or Programming &/or Computer Consulting. Reqr. work experience in development of application programs on IBM mvs/tso and with DB2, CICS and COBOL. Employer is S/W development/consulting firm. Relocation to various client sites throughout the U.S. for periods of & mos. to 2 yrs required. "Employer paid ad". E.O.E. Send resumes to: 7310 Woodward Ave., Rm. 415, Detroit, MI 48202. Ref #67566.

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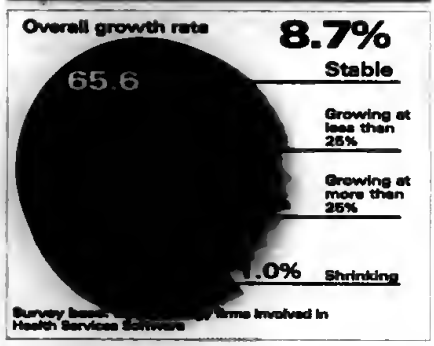

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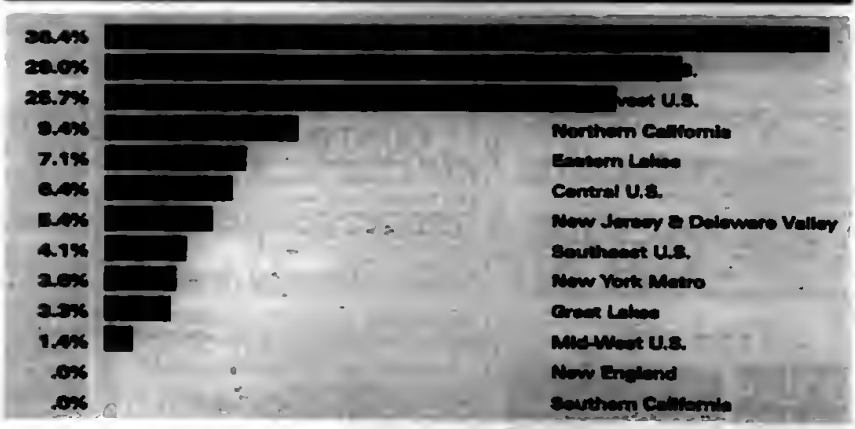

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Marketplace

Let there be light

New infrared connections bring huge throughput gains

By Chris DeVoney

As barriers to speed drop, infrared technology is gaining an increased role in connectivity.

Users and information systems departments for years have fought the classic problems associated with portable computers: installing large applications, moving working files, synchronizing desktops and notebooks and disrupting cables to print files from notebooks.

Notebook manufacturers offered infrared ports as a solution. Operating at serial port speeds of 115K bit/sec., notebooks could wirelessly send jobs to a printer or exchange files with a desktop.

Though convenient, infrared connectiona were generally considered too slow. IBM pioneered the first 1.2M bit/sec. infrared ports, which let ThinkPad notebooks communicate eight times faster, but only among themselves. Desktop receivers, which connect to the serial port of the printer or desktop computer, still topped out at 115K bit/sec.

Review

Infrared devices

Recent advances raise the ante. Hewlett-Packard Co.'s Netbeam IR ($299) and Extended Systems, Inc.'s JetEye Plus ($349) are network-compatible infrared devices that connect any portable to a 10Base-T or 10Base-2 Ethernet LAN. Token Ring will follow this summer. Support for Infrared Data Association (IRDA) standards for hardware, operating systems and applications software communications makes the connection transparent. The 4M bit/sec. data rate of the network adapters (about the same as a double-speed CD-ROM drive) and recent high-end notebooks makes the connection speed practical.

We conducted several tests in which we used three notebooks: a Gateway 2000, Inc. Solo 90 that uses a standard 115K bit/sec. infrared port, an IBM ThinkPad 760 with a 1.2M bit/sec. port and an HP Omnibook 5500 with a 4M bit/sec. port.

The difference between wired and wireless connections when printing typical letter-size documents or graphics-laden pages on an HP DeskJet 340 or LaserJet 5P was negligible. The difference came when printing long documents on the LaserJet. With a 20-page document, the parallel connection was twice as fast as the infrared connection. But the wait was manageable because the report took less than five minutes to print.

The wait for copying files depends on the connection and the software. With the Netbeam IR or JetEye Plus on a Windows NT and Ethernet network, it took about six minutes to copy a 12M-byte movie clip from a ThinkPad to a networked desktop system. The Omnibook took less than a minute, a tribute to its faster port. But Windows reported that the Solo would take 59 minutes.

Though you may be able to cut the cable, infrared connections have several rough spots. They are limited to about 5 feet and follow a line-of-sight path. Cluttered desks are the bane of infrared, and the location of infrared ports on the notebook is important. The ThinkPad conveniently locates infrared ports on the front and back sides. The port on Digital Equipment Corp.'s HiNote is on the right side, an awkward location on most desks for making a connection.

The plug-and-play feature of Windows 95 and Windows NT 4.0 doesn't cover the multistep installation of IRDA drivers. Reading the highly legible manuals solves this problem. Manually restarting the infrared network connection on the notebook each time Windows restarts can be annoying.

Software that automatically synchronizes the notebook and desktop, such as Traveling Software, Inc.'s Laplink and Puma Technology, Inc.'s TranXit Pro, has somewhat clumsy user interfaces but is much better than the almost-worthless Windows 95 Briefcase.

Despite the bumps, infrared is an attractive alternative to hard-wired cables, docking stations and PC card network adapters. Colleges and companies can offer printing bull pens for notebook users. As more notebooks incorporate 4M bit/sec. ports, making the corporate LAN connection will become natural. ■

DeVoney is a freelance writer in Seattle.

HP's Netbeam IR, like Extended Systems' JetEye Plus, moves data from portables at up to 4M bit/sec.

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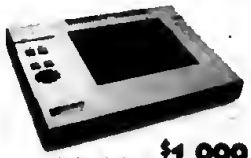

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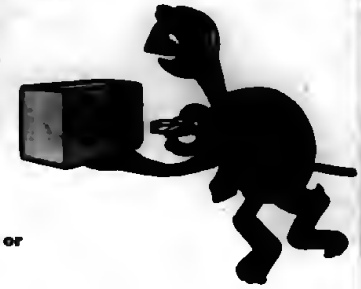

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Looking for an encore

Over the past five years, the three leading database companies have made a lot of money for investors. But recent financials from some of these companies have been uninspiring. Sybase, Inc. (Nasdaq:SYBS) reported a loss in its latest quarter, and Informix Corp. (Nasdaq: IFMX) is smarting from two consecutive quarters of light U.S. revenue growth.

Is the hot streak ending for the data kings?

No, but it's about to change dramatically. The inexpensive online transaction processing (OLTP) engines that have brought these firms so much success have become commodities.

Today, all three vendors' products can create, read, update and delete records reliably and quickly.

Data warehousing will help, although it's still less than 10% of the OLTP market. Its rising popularity will prompt the sale of new database licenses. But to sustain the 40% growth to which investors have become accustomed, the database companies have to find something else to store besides structured data, which makes up only 20% of all business data. Consequently, they are rushing to build "universal servers," databases that store audio, video, spatial and other types of data.

As World Wide Web pages evolve, these new data types will become common. After all, why look at a text description of a part on order when you can view it and rotate it?

Informix has the most innovative universal server technology, but Oracle Corp. (Nasdaq: ORCL) has an edge in integration and near-term practicality. The good news for both companies is that Microsoft Corp. (Nasdaq:MSFT) is nowhere in data warehousing and abstract data types and is unlikely to get there any time soon because it will be too busy putting out Web fires for the next three years.

The bad news is that technology transitions rarely happen smoothly. Consequently, we could see growth slow as database vendors push users toward new technology. But assuming users make the leap, we'd bet on Informix and Oracle for years to come.

Phillips is enterprise software industry analyst at Morgan Stanley & Co., a global investment banking firm in New York. He welcomes comments at chasp@ms.com or (212) 761-4450.

Companies duck into

SAFE HARBOR

New law means corporations can make bolder predictions

By Alan R. Earls

Thanks to the passage of the Private Securities Litigation Reform Act late last year, shareholders are hearing more substantial statements from public companies.

The act contains a safe harbor provision that allows companies to release more details about their expectations, as long as the statement includes a disclaimer with "meaningful" cautionary language. The law was designed to protect companies from frivolous shareholder lawsuits, which have been rife in the high-tech industry. According to the American Electronics Association, more than half of the Top 150 Silicon Valley companies have been targets of such suits in recent years.

Companies are already becoming more communicative, according to Bruce Vanyo, head of Securities and Exchange Commission (SEC) litigation for Wilson, Sonsini, Goodrich and Rosati, a law firm in Palo Alto, Calif. "I've heard that within 30 days of the law's passage, more than 100 companies changed their reporting practices," he says.

George Solman is CEO of one of those companies, Centigram Communications Corp., a maker of audio information processing systems in San Jose, Calif. Because of safe harbor protection, the company has been able to release information about new product development and report product sales.

"Before this, we would have been very strongly advised by our counsel to say nothing," he explains.

Straight talk

Previously, companies were paranoid about releasing any information, says Michael Murphy, editor of "The California Technology Stock Letter" in Half Moon Bay, Calif. "I've gone to some analyst meetings where the company's executives would just read their press release and go home without answering any questions," he says. In contrast, Sun Microsystems, Inc.'s most recent analyst briefing, for example, was much more candid, he notes.

Yet some say the law's longer-term effect and durability have yet to be proved and that the threat of lawsuits will remain until the law's provisions have been challenged in court.

"It's too early to tell how this law will work out and whether it will really control frivolous suits," says Arthur Patterson, managing partner at Accel Partners, a venture capital firm in Princeton, N.J.

Patterson says smart companies will sit tight until the law is challenged in the courts. Vanyo is also warning corporate clients to remain cautious until courts stabilize the law's interpretation.

Earls is a freelance writer in Franklin, Mass.

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The Week in Stocks

Gainers

PERCENT

Data Base Inc.	43.8
Exmed (L)	34.2
Network Computing Devices	19.6
McAfee Associates	19.0
Borges Systems Inc.	17.0
TAC-net Systems	16.0
4th Dimension	15.1
Peoplesoft	12.1

DOLLAR

Bay Networks Inc. (H)	9.50
Cascade Communications (H)	7.00
Security Dynamics Tech. (H)	6.00
Psychiatrix	5.00
Peak Technology Group	3.00
Network Computing (H)	2.50
Peoplesoft Inc.	1.50
Filenet Corp.	1.38

Losers

PERCENT

PC Systems Inc.	-40.6
Best Systems Inc. (H)	-30.0
PictureTel Systems Inc.	-17.0
Smart Dynamics Research	-16.7
Intergo Corp.	-16.4
Autodesk Inc.	-14.7
Bird Dog Systems Inc.	-14.5
Parkard Int'l Inc.	-14.3

DOLLAR

3COM Systems Inc. (H)	-9.00
America On-Line	-7.88
Netscape Comm. Corp.	-7.38
Intergo Corp.	-7.25
Cambridge Tech. Partners	-7.25
Adaptec Inc. (H)	-7.13
Cabletron Systems	-6.13
3DO	-6.00

Industry Almanac

Read-Rite 'rithmetic

Some investors want to get back to the basics — no flashy software companies or trendy Internet start-ups for them. What could be more basic than the components that make up disk drives?

Read-Rite Corp. (Nasdaq:RDRT) in Milpitas, Calif., supplies heads and platters to disk drive makers **Western Digital Corp. (NYSE: WDC), Quantum Corp. (Nasdaq:QNTM)** and **Seagate Technology, Inc. (Nasdaq:SGAT)**. Industry analysts agree that Read-Rite has many of the pieces in place to be a success, but some say the company has slipped in getting products to market.

"They have everything except hot products," says Roxane Googin, an analyst at Gruntal & Co. in Beverly Hills, Calif. "They've had the Tripad 3 head in evaluatioos so long, they let competitors get in ahead of them." Googin gives the stock a neutral rating and says she won't buy it until it slips back to $18.

But some analysts say the stock is a good play because the company is in the enviable position of selling bullets to both sides of a war. "No matter who wins the data storage war, Read-Rite will probably be providing them heads," says Mike Murphy, editor of "The California Technology Stock Letter," a newsletter in Half Moon Bay, Calif.

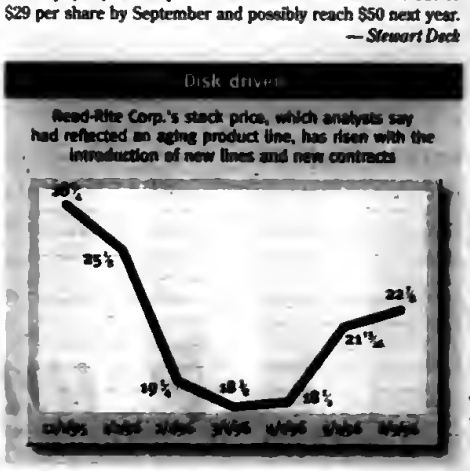
Read-Rite also leads in the hottest head-component technology — magneto-resistive heads, Murphy says.

Murphy says he expects Read-Rite's stock to rise to $25 to $29 per share by September and possibly reach $50 next year.

— Stewart Deck

Disk drives

Read-Rite Corp.'s stock price, which analysts say had reflected an aging product line, has risen with the introduction of new lines and new contracts



Exch	52-Week Range			June 2 1996 Price	Wk Net Change	Wk Pct Change
COMS	51.63	30.50	3COM Corp	47.63	-1.63	-3.3
ANT	49.00	42.25	ANSWERTECH Corp.	46.00	-0.75	-1.3
ARE	22.13	15.63	Answer Intl.	17.13	0.75	4.5
APTS	12.13	3.75	Apertus Tech.	1.88	-0.13	-5.1
I	49.00	49.00	At & T	61.00	-1.38	-2.2
ASND	71.25	50.13	Ascend Communications	63.69	-2.81	-4.2
BNYN	18.63	6.00	Banyan Systems Inc	10.75	1.06	17.8
BAY	30.00	20.00	Bay Networks Inc.	27.13	-1.63	-6.5
BEL	80.50	63.38	Bell Atlantic Corp.	62.38	0.13	0.2
BLS	65.88	29.88	Bellsouth Corp.	59.00	-1.13	-2.7
BRKT	49.00	9.11	Brooktrout Technology	45.25	-0.75	-1.6
CS	87.75	49.63	Cabletron Systems	50.88	-6.11	-6.6
CSCC	94.25	50.81	Cascade Communications (H)	64.25	2.00	12.2
CGRM	25.13	12.75	Certhman Communications	16.38	-0.75	-4.4
CSCO	57.88	22.12	Cisco Systems Inc.	55.75	0.75	1.4
CLIX	11.38	4.38	Compression Labs Inc.	7.63	-0.13	-1.6
CMNT	12.75	4.00	Computer Network Tech.	8.00	-0.25	-3.0
XCOM	34.38	8.25	CrossCom	10.75	-0.50	-3.4
DIGI	54.00	31.00	DSC Communications	37.88	-2.50	-7.9
FORE	64.75	12.88	FORE Systems Inc	36.25	-3.88	-9.7
GDC	21.88	10.00	General Datacomm Indus.	10.38	0.63	8.8
GSX	42.38	10.00	General Signal Networks	10.63	0.50	1.1
GTE	89.25	32.50	GTE Corp.	47.63	-0.13	-0.3
LU	99.25	29.25	Lucent Tech.	37.63	-0.63	-1.6
MCIC	25.13	19.38	MCI Communications Corp.	20.13	-0.88	-3.0
MICm	14.50	5.50	MICOM Communications Corp.	11.75	-0.06	-0.5
MNPI	34.50	11.25	Microcom Inc.	10.00	2.00	10.0
NETm	34.00	9.38	NetManage Inc.	14.25	-0.50	-3.8
NTRX	50.50	3.63	Netrix Corp (H)	9.13	-0.63	-6.4
NCDI	13.00	2.88	Network Computing Devices	4.50	1.00	28.6
NWK	42.00	21.00	Network Equipment Tech.	16.00	0.50	1.4
NETG	50.38	11.38	Network General (H)	26.38	3.50	10.5
XIn	74.25	25.00	Newbridge Networks Corp.	47.00	-4.63	-9.5
NT	55.13	25.50	Northern Telecom Ltd. (H)	51.75	-0.25	-1.6
NOVL	21.63	11.38	Novell Inc.	14.13	-0.19	-1.3
NVN	38.25	20.25	Novus Corp	26.50	0.38	0.0
OCTL	26.75	13.00	Octel Communications Corp.	26.00	-0.50	-2.0
ODSI	41.25	12.00	Optical Data Systems Inc.	20.50	1.75	2.2
PAC	85.25	25.63	Pacific Telesis	33.38	0.13	0.4
PCTL	44.72	20.75	PictureTel Corp	30.63	-0.50	-1.0
PTON	6.75	4.75	Photonics Inc.	5.75	0.25	4.5
RACO	7.88	3.88	Racotek Inc.	6.13	0.19	2.1
RETK	16.88	1.81	Retix	9.11	0.25	2.8
SBC	80.25	50.63	SBC Communications	49.50	0.50	0.0
SFA	31.38	11.38	Scientific Atlanta Inc.	18.00	-0.88	-4.6
SHVA	75.75	39.13	Shiva Corp (H)	72.25	2.88	3.8
FON	83.00	30.25	Sprint Corp	41.88	-0.38	-0.9
SMSC	23.50	12.50	Standard Microsystems Corp.	16.75	1.38	8.9
STRM	57.38	20.50	Stratacom Inc.	35.25	0.00	1.3
TBIT	13.75	3.38	Telebit Corp (H)	13.25	1.50	12.1
USRX	105.50	50.50	US Robotics	95.50	1.00	1.1
USW	68.38	50.38	U S West Inc.	52.75	0.25	0.5
XIRC	17.50	6.00	Xircom	15.63	-0.63	-1.8
XYLN	76.00	51.25	Xylan Corp	57.75	-5.63	-8.9
AALR	16.50	5.63	Advanced Logic Research	9.38	-0.25	-2.6
AAPL	30.12	23.00	Apple Computer Inc.	24.38	-2.00	-7.6
ASTA	18.50	4.63	AST Research Inc.	7.25	-0.69	-8.2
CPQ	50.25	35.88	Compaq Computer Corp	48.38	-0.11	-0.3
DELL	57.25	29.00	Dell Computer Corp (H)	55.00	-0.11	-0.6
GATE	64.13	18.00	Gateway 2000 Inc. (H)	39.88	1.63	4.5
HWP	115.38	67.88	Hewlett Packard Co.	104.19	-2.88	-2.7
IRUE	29.88	9.00	Micron International Inc.	15.11	-0.81	-5.1
NIPNY	75.13	51.00	NEC America	53.88	1.38	2.6
SGI	45.63	31.13	Silicon Graphics	25.50	3.00	7.5
SUNW	85.75	19.25	Sun Microsystems Inc. (H)	43.25	0.00	0.0
AMH	13.50	6.75	Amdahl Corp	11.50	-0.13	-1.1
DGN	19.13	7.75	Data General Corp.	11.00	0.13	1.0
DEC	76.50	35.13	Digital Equipment Corp	46.13	-5.88	-11.3
IBM	128.88	83.13	IBM	101.38	-4.13	-3.7
MDCD	30.25	3.25	Meridian Data Inc.	16.75	-0.56	-3.2
NETF	7.50	3.88	NetFrame	5.25	0.25	5.0
SQNT	25.38	10.13	Sequent Computer Sys.	13.25	-0.38	-2.8
SPOS	49.38	2.88	Sequoia Systems Inc.	3.50	-0.13	-3.6
SIRA	36.13	23.00	Stratus Computer Inc.	30.63	-1.63	-5.9
TDM	17.50	8.38	Tandem Computers Inc.	12.38	-0.25	-2.0
TRCD	7.25	2.00	TriCord Systems	2.25	1.00	16.0
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AMSWA	8.75	3.63	American Software Inc.	5.38	0.13	2.4
APLX	62.50	8.25	Applix Inc.	32.00	-0.50	-1.5
ARSW	82.75	48.25	Arbor Software	61.25	0.50	0.8
ADSK	53.00	27.25	Autodesk Inc.	34.25	-0.88	-1.7
BACH	11.88	4.63	Bachman Info. Systems	2.50	-0.75	-0.1
BGSS	50.00	29.25	BGS Systems Inc. (H)	41.00	-9.00	-18.0
BMCS	67.75	32.38	BMC Software Inc.	62.75	-0.50	-0.8
BOOL	26.75	19.25	Books and Babbage	25.00	0.50	2.6
BORL	21.25	10.13	Borland Int'l Inc.	11.50	-1.88	-14.2
BOBY	59.50	15.38	Business Objects	41.88	-4.13	-9.0
CYE	27.88	14.13	Cheyenne Software Inc.	21.38	0.13	0.6
CGNZ	27.38	8.38	Cognos Inc.	24.75	-0.75	3.1
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CSRE	31.50	11.13	Consilium Inc. (H)	30.38	-1.11	-3.8
COSFF	39.38	0.38	Cosel Corp	13.25	-0.25	-2.0
DWTI	15.75	5.25	Dataware Technologies Inc.	4.75	-0.00	-0.9
FILE	67.00	30.75	Filenet Corp	49.00	3.25	4.6
DQDOF	8.25	5.38	Fox Data Trends	7.50	0.88	13.5
FTPS	40.63	8.11	FTP Software Inc.	10.38	0.50	11.7
GSOF	16.00	7.00	Group I Software	10.25	0.00	0.0
GPTAF	10.50	-3.75	Gupta (L)	6.38	1.75	36.8
HMN	50.88	17.00	Hummingbird Comm. Ltd.	19.00	-3.13	-14.1
HYSW	30.50	9.75	Hyperion Software Corp	14.00	-0.50	2.6
IRE	18.63	8.00	Information Resources	12.63	0.13	1.0
IFMX	86.75	14.88	Informix Corp	23.88	0.69	3.6
INGR	50.13	30.00	Intergraph Corp	13.06	-0.06	-0.5
LEAF	12.63	6.00	Interleaf Inc	7.25	-0.11	1.6
ISLI	28.25	8.75	Intersolv Inc.	11.38	-0.50	-3.2
INTU	38.75	32.13	Intuit Inc.	51.25	-1.00	-1.9
LGWX	22.75	19.00	Logic Works	16.75	-0.63	-4.3
MAPS	40.00	10.00	Mapinfo Corp	14.50	-0.25	-1.9
MATH	9.25	3.00	MathSoft	7.13	-0.75	-9.5
MCAP	47.50	13.13	McAfee Associates	47.50	9.50	25.0
MENT	21.88	10.88	Mentor Graphics	17.13	-0.88	-4.9
MFDV	21.25	8.25	Micro Focus	13.50	-0.75	-5.3
MGXI	50.63	4.00	Microgrammx Inc.	17.13	0.25	1.5
MSFT	121.25	79.88	Microsoft Corp (H)	105.63	2.19	1.6
ORCL	36.75	22.75	Oracle Corp.	33.50	0.75	0.8
PMTC	43.25	21.50	Parametric Technology (H)	46.63	1.25	3.0
PARQ	14.63	6.63	ParcPlace Systems Inc.	10.88	-2.38	-17.9
PSFT	75.25	24.50	Peoplesoft	49.25	-1.00	-1.4
PTEC	26.38	8.65	Phoenix Technologies (H)	19.63	0.75	3.3
PSQL	16.88	3.11	Platinum Software	10.75	0.25	2.4
PLAT	26.00	11.25	Platinum Technology	16.75	-0.88	-5.0
PRGS	14.00	14.63	Progress Software Corp	15.75	0.75	5.0
RNBO	30.75	16.00	Rainbow Technologies Inc.	22.00	-0.75	-3.3
REDB	61.00	29.50	Red Brick Systems Inc.	30.00	-4.13	-14.5
ROSS	8.13	2.19	Ross Systems	6.50	-0.50	-7.5
SCOC	12.13	5.38	SCO Inc.	7.75	0.13	1.6
SDTI	100.25	12.63	Security Dynamics Tech. (H)	99.25	6.00	6.7
SHEY	51.75	11.50	Softkey Int'l Inc.	25.25	0.75	3.0
SPCO	5.13	2.19	Software Publishing Corp	2.63	-0.13	-4.5
SQAX	50.25	16.00	SQA Inc.	44.25	-0.75	-2.1
SOTA	19.38	6.63	State of the Art (H)	15.88	0.75	1.3
SSW	91.38	31.75	Sterling Software Inc. (H)	77.25	-3.75	-4.6
SDRC	37.38	30.50	Struct. Dynamics Research	30.00	-4.63	-16.7
SYBS	58.75	31.25	Sybase Inc.	37.63	-0.25	-1.1
SYNC	33.25	9.88	Symantec Corp.	24.38	-1.38	-8.7
SNPS	46.75	33.00	Synopsys (H)	44.00	-0.63	-1.4
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VLSI	39.13	20.75	VLSI Technology	26.00	-1.75	-7.9
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APCC	25.88	7.50	American Power Conversion	12.38	-0.11	-1.5
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EMLX	28.50	6.50	Emulex Corp	19.50	0.63	0.8
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QNTM	28.50	25.00	Quantum Corp	22.50	-1.88	-7.0
RDUS	14.40	0.94	Radius Inc.	1.00	-0.50	-11.1
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STLC	8.75	1.25	Stylastic Corp.	3.63	-0.63	-10.0
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AUD	62.38	30.75	Auto Data Processing	50.25	0.00	0.0
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CEN	54.88	32.63	Ceridian Corp (H)	51.11	0.75	3.4
CDO	38.63	18.88	Condyco Inc (H)	27.25	-0.75	-0.9
CMRZ	54.00	21.00	Computer Horizons	47.25	1.63	3.6
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TSK	31.88	20.75	Computer Task Group	27.25	-0.69	-3.1
CPU	48.75	12.75	CompuUSA Inc.	42.63	-1.13	-4.7
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EGGS	14.25	5.00	Egghead Discount Software	12.63	0.88	2.4
GMI	58.50	41.50	General Motors E (EDS) (H)	57.00	0.50	0.7
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INEL	14.63	3.50	Intelligent Electronics	10.50	0.19	1.8
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MSEL	8.38	3.25	Misys	4.25	0.00	0.0
MICA	14.25	2.25	Microage Inc (H)	14.44	1.19	9.0
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SEIC	28.50	19.25	SEI Corp	23.50	-0.50	-2.1
SMLD	72.11	37.00	Shared Medical Systems	65.50	-0.75	-0.38
SSPE	26.38	12.00	Software Spectrum Inc.	24.50	-0.25	-1.01

KEY (H) = New annual high reached in period (L) = New annual low reached in period

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VisualBasic, Java vie for users

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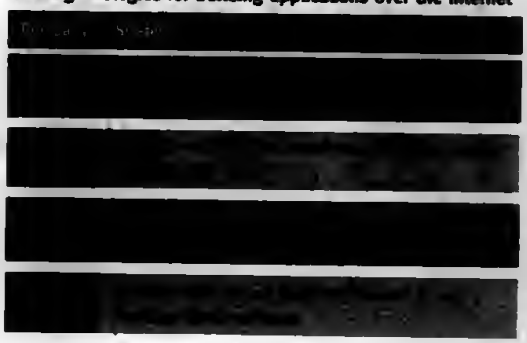
Dueling strategies for building applications over the Internet



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Notebook advances backfire

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"Some portables get so hot they can take a crease right out of your pants," said Gerry Purdy, an analyst at Mobile Insights, Inc. in Mountain View, Calif.

Cause and effect

Notebook vendors downplay the design challenge. But according to Purdy, "There's this constant battle between performance in s notebook and the management of the power in the unit."

"As you increase performance, you are going to increase the power consumption and the heat load applied to the system," he explained. "There is a real challenge here that we didn't see just two years ago."

Users and industry observers say the problems posed by the faster chips and the thinner, lighter designs include the following:

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- Notebook vendors are concerned about the 150-MHz mobile Pentium chip, which Intel Corp. plans to release in the third quarter. Industry observers say the 150-MHz chip provides only s 5% boost above the 133-MHz chip.

Mobile Rx

Suggested remedies for recent laptop problems

Problem	Solution
Battery life shortened by faster chips and components such as disks used to dissipate heat	■ Some vendors offer modular design, which lets users swap out other components to add a second battery ■ Power supply management features such as standby, suspend and hibernation modes ■ External battery chargers
Overheated PC cards	■ Heat pipe technology, which wicks heat away from the PC cards ■ Internal fans for heat dissipation

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Online editor Michael Fitzgerald and senior writer Michael Goldberg contributed to this story.

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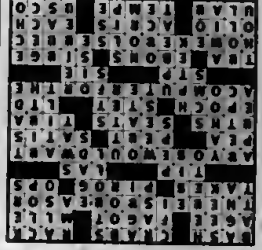

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Dueling strategies for building applications over the Internet

Company	Strategy
[redacted]	Lock customers into Microsoft products; sell operating systems and Web-enabled packaged applications
IBM	Appeal to mainframe-oriented users; sell Web-enabled hardware and tools
[redacted]	Push Java's platform independence; sell Web server hardware and development tools
Netscape	Leverage wide use of Navigator browser to sell Netscape server software

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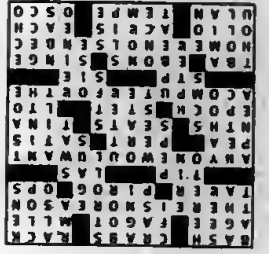
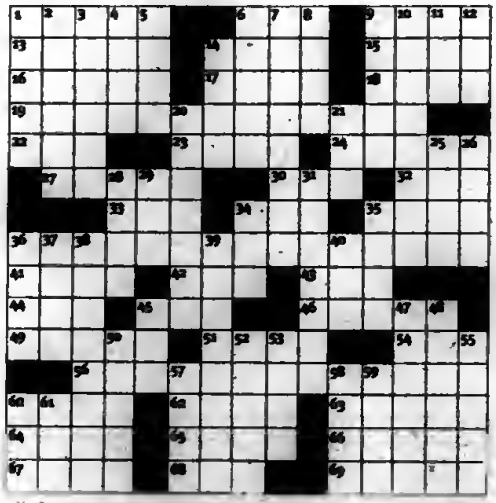


Killer corporate philosophy

Computerworld crossword by Rick Bennett

This unofficial motto was allegedly a stake driven into the heart of a major software player. What's the motto, and who said it?



No. 9 Solution on previous page rbennett9@tcd.net

ACROSS

1 Slang for backward
6 Mouse milieu
9 Mimics
13 A kind of seal
14 Pallid
15 Fertility god
16 Expendable aircraft
17 __ Romeo, car
18 Showily imitative of style
19 START OF MOTTO
22 That which is deserved
23 Recurring only at long intervals
24 Monetary unit
27 Artiodactyl mammal
30 Pre-acquisition name of Silicon Valley's Cadence
32 Weep
33 Source of campaign funds.
34 Microprocessor debugging dev.
35 Exhibiting vigorous good health
36 MOTTO, PART 2
41 Herbaceous plant
42 Martyr's initials
43 The greatest
44 Light conversation for social occasions
45 One really COMMITTED to your breakfast
46 Silicon Valley supplier of network cards
49 Wake-up signal?
51 Fencing foil
54 Ores used in nuclear reactor rods, for short
56 END OF MOTTO and alleged SOURCE
60 National capital
62 E-mail acknowledgment, abbr.
63 She aided Jason in taking the Golden Fleece
64 Forever, to a Pentium Pro
65 About aviation
66 Put up
67 Expression of contempt
68 Airport luggage tag for creator of 17 ACROSS?
69 What one does to a bunch of subroutines

DOWN

1 Accomplished again
2 Too much noise
3 Garden toot
4 Gambling town
5 A European river
6 More of 14 ACROSS
7 Outdoors
8 Turn a _ ear
9 Manila hemp
10 Devoted to a cause or party
11 Take in solid food
12 *Demolition Man* actor, to friends
14 Hemingway, to friends
20 Ancient Greek coin
21 Air watchdog initials
25 Moment of truth for a new pilot
26 Drive the getaway car
28 A domed church recess
29 Door or place follower
31 Contraversialist
34 H-L string
35 First Chinese dynasty
36 From _ to riches
37 Mounted soldier
38 Kinds of fools
39 Head of a lynch mob who fancies himself a talkshow host?
40 Chinese river
45 One JUST INVOLVED in your breakfast
47 A kind scholar, e.g. Clinton
48 Have an emotional or cognitive impact upon
50 What a hacker will do to a database
52 Type genus containing the typical manakins
53 Prefix meaning outside
55 What one collects on Web page hits, abbr.
57 Periods
58 Augury
59 Dry
60 Power supply rating, for short
61 Inflation rating, for short

Inside Lines

Second City presents *Citizen Gates*

Bill Gates might have skipped Comdex in Chicago last week, but visitors who wanted to catch a glimpse of the Microsoft chairman could have stopped in at Second City. The famed improvisational comedy troupe that gave John Belushi and Bill Murray their starts was presenting *Citizen Gates*, a humorous send-up of the billionaire software maker. Wearing a baby-blue cardigan sweater and nerdy dark-framed glasses, the Gates character appeared periodically in the dozen or so skits to remind the audience just how rich he was. By the end of the two-hour show, Gates had bought the rights to the color red and made about $7 million.

Stop spreading the Word . . .

Speaking of Microsoft, the company's Office team recently sent out a limited-edition CD-ROM that contains a list of 20 products compatible with the 32-bit Office. Just one problem: Two of the files on the CD-ROM were infected with a Word Macro virus. Microsoft has begun distributing a downloadable Macro Virus Protection file to help users disinfect their systems. It installs a set of protective macros that detect any suspicious Word files and alert network administrators and users.

SCO to launch low-flying Comet

SCO next week will introduce a new version of its low-end OpenServer operating system, code-named Comet, that adds a Novell NetWare 4.X gateway and support for up to 4G bytes of addressable memory. Comet will also include some initial compatibility with UnixWare, the more enterprise-size operating system that SCO bought from Novell last year. A unified development tool kit for the two SCO operating systems is due later this year.

A Notes sandwich

Industry sources say Lotus is planning announcements at PC Expo next week to bolster the use of Notes as middleware. Lotus wants to link Notes to various enterprise back-end systems so users can have one point of access to data and transactions from these various sources.

The 5th Wave by Rich Tennant

"What do you mean you're updating our Web home page?"

I'm OK; you're OK; my computer is OK

Worried about computer security? Maybe your computers should get in touch with their feelings. At the recent Symposium on Security and Privacy, sponsored by the Institute of Electrical and Electronics Engineers, a university professor presented a paper titled "A Sense of Self for Unix Processors." Self-aware machines can detect suspicious "anomalies" it seems. Other "biologically inspired topics in computer security" included applications of immunology and virology to safe computing.

Problem? What problem?

Sixty-two percent of North American IS executives said their companies are taking steps necessary to deal with the year 2000 date-change issue. But the Olsten Corp.'s survey of more than 300 IS executives showed that 13% of the firms polled were unaware of the pending problem.

Hewlett-Packard's technical support center in Mountain View, Calif., recently logged a heavy load of calls from some remote users who were looking for an entirely different kind of support than the center's workers are used to disseminating. These were users of remote controls for changing television channels, and they were really hoping to chat with Uno, a Nigerian exotic dancer who has a show on public-access cable TV channels in New York and Los Angeles. Unfortunately, Uno's accent made it hard to tell whether her chat line's number began with "800" or "900." Callers who chose the toll-free route found HP at the other end instead of the TV hoofer. We certainly have no exotic dancers here at Computerworld, *but please contact us anyway if you have news tips to pass along. News editor Patricia Keefe can be reached at patricia_keefe@cw.com or (508) 820-8183.*

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